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Ten new species from the Patagonian Andes (Argentina and Chile), mostly belonging to a newly designated *Stigmella purpurimaculae* group (Lepidoptera: Nepticulidae)

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Abstract

Ten new *Stigmella* Schrank species are described: *Stigmella purpurimaculae* Remeikis & Stonis, **sp. nov.**, *S. cana* Remeikis & Stonis, **sp. nov.**, *S. truncata* Remeikis & Stonis, **sp. nov.**, *S. sceptra* Remeikis & Stonis, **sp. nov.**, *S. concreta* Remeikis & Stonis, **sp. nov.**, *S. pseudoconcreta* Remeikis & Stonis, **sp. nov.**, *S. quadrata* Remeikis & Stonis, **sp. nov.** (all belonging to the newly designated *S. purpurimaculae* group), and *S. semilactea* Remeikis & Stonis, **sp. nov.**, *S. brutea* Remeikis & Stonis, **sp. nov.**, *S. pseudodigitata* Remeikis & Stonis, **sp. nov.** (not attributed to a species group) are described from the Andes (Patagonia: Argentina and Chile). For the species of the *purpurimaculae* group, a partial reduction of phallus, dentate cornuti, and strong development of utriculus (which can be equal or longer of the corpus bursae) are characteristic. Some of the species of the *purpurimaculae* group were collected near *Nothofagus pumilio* (Poepp. & Endl.) Krasser, Nothofagaceae, but there is still no confirmation that *Nothofagus* is a host-plant. All new *Stigmella* species are illustrated with photographs and drawings of the adults and genitalia.

Key words: the Andes, Nepticulidae, new species, Patagonia, the *purpurimaculae* group, *Stigmella*

Introduction

Nepticulidae are a very distinct, isolated family of primitive monotrysian Microlepidoptera with a global distribution. Only the European nepticulid fauna can be considered to have been more or less thorougly studied (van Nieukerken 1985, 1990, 2007; Johansson *et al*. 1990; Puplesis 1994; van Nieukerken & Johansson 2003; Laštuvka & Laštuvka 1998, 2009; van Nieukerken *et al.* 2010; Laštuvka *et al.* 2013, etc.). Studies in other regions of the world are much less complete in reflecting the actual diversity of the group, although general coverage compares well with some other groups of Microlepidoptera.

The Neotropical region, while vast and with a hugely diverse biota, is comparatively unexplored with respect to the collection and study of Nepticulidae. The first two species recorded from the region, *Stigmella johannis* and *Fomoria molybditis*, were described by Zeller (1877) (as *Nepticula*) from Colombian material collected by Johann and Nolcken in 1871. Much later, five additional species were reported from Peru and two from Guyana by Meyrick (1915); however, one of the Guyanese species (*Enteucha cyanochlora*) was placed in the Lyonetiidae and only recognized as nepticulid some 70 years later (Davis 1984, 1985). Until the first monographic review of the known Neotropical fauna with the documentation of 37 new taxa from Belize, Peru and Argentina by Puplesis & Robinson (2000) there have been practically no investigations of Neotropical Nepticulidae, except for isolated descriptions of a few new species from Puerto Rico (Forbes & Leonard 1930) and Argentina (Meyrick 1931; Bourquin 1962) and a few relatively recent discoveries in Florida (Davis 1978; Wilkinson 1981) of species with Neotropical affinities. *Stigmella plumosetaeella* was described by Newton & Wilkinson (1982) from Arizona, USA, and Puplesis & Robinson (2000) later recorded the species from southwestern Mexico. In Puplesis &

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Robinson (2000) 58 species of Nepticulidae from Central and South America were reported (including five species currently known from southern Florida as members of the Neotropical fauna). This revision provided the basis for later investigations of the Neotropical fauna, which was soon followed by several other descriptions and checklists: Puplesis *et al.* (2002a) describing 17 new species from Ecuador; Puplesis *et al.* (2002b) providing an updated checklist with new distribution data; Šimkevičiūtė *et al.* (2009) describing 3 species from Mexico; Stonis *et al*. (2013b, 2013c, 2013d) describing 12 new species from Mexico, Belize and Guatemala. Unfortunately, most of the material collected by previous authors was obtained by light trapping, with only a few species reared from the larval stage. Only in the most recent publications does reared material prevail (Stonis *et al*. 2013b, 2013c, 2013d).

Here we provide descriptions of ten new species, which are described from substantial material from the southern Andes (Argentina and Chile). No host associations are known, however, many studied specimens were collected by net, both by sweeping branches of *Nothofagus*, or flying freely especially in the early morning (O. Karsholt, pers.comm.).

The genital morphology of the newly discovered Patagonian species includes some very interesting features not known from other faunas (see the designation of *Stigmella purpurimaculae* group). We also have noticed an unusually strong intraspecific variation of the male genitalia. Apparently, as it was observered previously (Puplesis & Robinson 2000), species from the lowland tropical forest of Belize and Ecuador seem morphologically more distinct and apparently more isolated both from each other (and from boreal species of the same genus) than are species from the southern Andes. Species differences in the Andean fauna are often slight, and problems of identification of similar species are compounded by intraspecific variation. In the Andean equatorial *Stigmella epicosma*, for example, both forewing pattern and genital morphology vary according to the altitude of the habitat (Puplesis & Robinson 2000). The preliminary impression of the Neotropical nepticulid fauna is one of two distinct faunal elements. The first is a relatively young element of species with distinct boreal affinities that show some evidence of recent, rapid speciation and localized geographical variation, occurring in the Andes and the southern temperate zone. The second element comprises more clearly differentiated and disjunct species occurring in lowland tropical forest and with perhaps older origins.

We hope that this publication of the material from Patagonia can be soon followed by additional studies of new taxa from the Andes (Stonis *et al. in prep*; Remeikis & Stonis *in prep*.), and will stimulate further studies of the Nepticulidae in this long neglected continent.

Material and methods

Substantial unidentified material was made available to us, collected by the Dannish entomologists Ebbe Nielsen and Ole Karsholt (the "Mision Cientifica Danesa) in 1978 and 1981, and deposited in the University of Copenhagen (ZMUC) in Denmark.

Techniques for genitalia preparation and protocols for description are outlined in Puplesis & Robinson (2000), Puplesis & Diškus (2003), and Diškus & Stonis (2012).

Genitalia were prepared following the method described by Robinson (1976). After maceration of the abdomen in 10% KOH and subsequent cleaning, male genital capsules were removed from the abdomen and mounted ventral side uppermost. Where the genital armature was particularly complicated, the genitalia were studied and sketched in glycerin before permanent mounting. The phallus was removed and mounted alongside the genital armature except in the case of some paratypes where it was left to preserve the full view of the genitalia. Female genitalia were removed entirely from the abdomen, cleaned and mounted ventral side uppermost. Genitalia and abdominal pelts of both sexes were stained with Chlorazol Black (Direct Black 38/Azo Black), and mounted in Euparal.

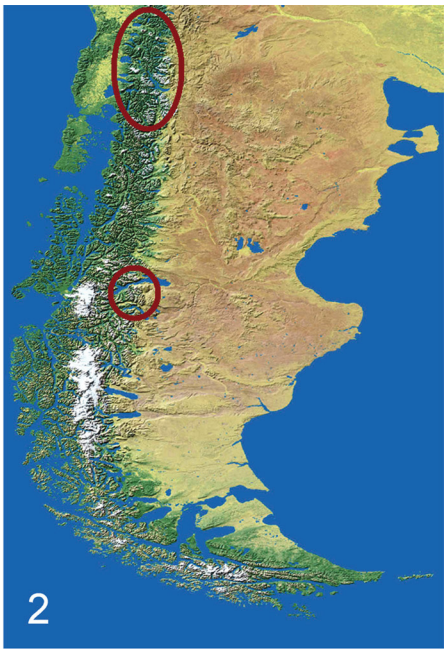
Forewing length is expressed as a range, where availability of material made this possible, measured along the costa from the wing base to the apex of the cilia. Wingspan was measured from the tip of the left wing to the tip of the right wing, where well-mounted specimens were available; in most other cases the forewing length was doubled and the thorax width added.

Permanent slides were photographed and studied using a Leica DM2500 microscope and Leica DFC420 digital camera.

The descriptive terminology of morphological structures follows Johansson *et al.* 1990, Puplesis & Robinson

(2000), Puplesis & Diškus (2003), and van Nieukerken & Johansson (2003), except for the term "aedeagus, which is refered here as "phallus.

The classification of Nepticulidae follows Puplesis (1994), Puplesis & Robinson (2000), and the Catalogue of the World Nepticuloidea & Tischerioidea by Diškus & Puplesis (2003).



FIGURES 1, 2. Collecting areas. 1, the forest of *Nothofagus pumilio*, Chapelco Lenga, Argentina, with Dr. Patricia Gentili-Poole in front (currently Collection Information manager, USNMNH, who kindly assisted during the "Mision Cientifica Danesa"); 2, major geographical areas of the fieldwork during the "Mision Cientifica Danesa" in 1978 and 1981.

Descriptions of new species

Species attributed to the newly designated *Stigmella purpurimaculae* group

1. *Stigmella purpurimaculae* Remeikis & Stonis, sp. nov.

(Figs 7–10, 31–40, 91–93)

Diagnosis. Externally, adults of the new species resemble a few other species of the *S. purpurimaculae* group, especially *S. truncata, S. sceptra and S. cana.* However, the combination of the purple spot of the forewing, the long vinculum, long, basally often angular phallus without chitinized rods, long uncus and the large rounded inner lobe of the valva distinguish the species from others *Stigmella*.

Male (Figs 7–10). Forewing length 2.1–2.3 mm; wingspan 4.9–5 mm. Head: palpi greyish cream to cream; frontal tuft usually entirely yellowish orange, sometimes mixed: dark greyish brown on frons, yellowish orange on vertex; collar yellowish cream to golden brown; scape yellowish cream to whitish; antenna half the length of forewing or shorter; flagellum with 28–32 segments, dark greyish brown to golden grey, usually with weak purplish iridescence on basal third. Thorax, tegulae and forewing grey to brownish grey with strong golden gloss; no fascia; apex deep purple to brown-purple, occassionally dark brown (or at certain angle of view fuscous brown); terminal and tornal cilia greyish brown to pale grey; underside of forewing fuscous brown, sometimes with weak to strong purple iridescence, with no spots or androconia. Hindwings grey to greyish brown on upper side and underside, with no androconia; their cilia greyish brown to grey. Legs shiny, brownish grey to fuscous grey on upper side and underside. Abdomen fuscous brown, shiny on upper side, dark grey to shiny golden grey on underside; anal tufts short, brown to brownish cream; anal plates grey to greyish cream.

Female. Forewing length about 2.3 mm; wingspan about 5.1 mm. Flagellum with about 21 segments. Otherwise as in male.

Male genitalia (Figs 31–40). Capsule much longer (365–385 μm) than wide (195–200 μm). Vinculum with two large lateral (anterior) lobes; ventral plate of viculum longer than usual in this species group. Uncus with long caudal lobes (Figs 34, 35). Gnathos with two narrow caudal processes with broadened basal parts (Figs 32, 34, 35); central plate of gnathos in the form of a narrow transverse bar. Valva (Figs 32, 33) 175–185 μm long, very broad (80–105 μm), with large chitinized and pointed apical process; inner lobe broadly rounded; transtilla with short pointed sublateral processes. Phallus (Figs 36–40) 265–310 μm long, 105–114 μm broad; chitinization of phallus tube is partially reduced in distal 1/4–1/5; vesica with numerous small dentate (Figs 37, 40) and some small spine-like cornuti (the later make only 5–10% of all cornuti). Manica absent.

Female genitalia (Figs 91–93). Total length about 690–890 μm. Anterior apophyses very short (about 40–50 μm long), posterior apophyses much longer (about 135–175 μm) and very narrow. Vestibulum broad, without sclerites. Corpus bursae with folded distal part and broader, ovally-shaped or round basal part, without signa, sparsely covered with pectinations only in proximal part, and with 6–8 short thickened spines (Figs 92, 93) in the area where the folded part of bursae extends into the accessory sac. Accessory sac broad, short but not prominent (barely distinct); ductus spermathecae short, with about 2.5–3 convolutions, extended into long (220–370 μm) and broad (about 110 μm) utriculus. Abdominal tip blunt, rounded.

Bionomics. Some specimens are collected around *Nothofagus pumilio;* however there is insufficient proof that this plant is the host-plant of *S. purpurimaculae.* Adults fly in October–December. Otherwise unknown.

Distribution. This species occurs in the southern Andes (Argentina) at altitudes ca. 800–1600 m (see Material).

Type material. Holotype: ♂, ARGENTINA, Río Negro, S. C. de Bariloche, Camino del Tronador, elevation ca. 800 m, 29.xi.1978, Mision Cientifica Danesa, genitalia slide no. RA393♂ (ZMUC). Paratypes: 1 ♂, ARGENTINA, Río Negro, S. C. de Bariloche, Colonia Suiza, elevation ca. 810 m, 7.xii.1978, Mision Cientifica Danesa, genitalia slide no. RA421♂ (ZMUC); 1 ♂, Pampa del Toro, elevation ca. 1000 m, 21.xi.1978, Mision Cientifica Danesa, genitalia slide no. RA422♂ (ZMUC); 10 ♂, 1 ♀, same, elevation ca. 900 m, 9–28.xi.1981, Nielsen & Karsholt, genitalia slide nos. RA396♂, RA398♂, RA403♂, RA407♂, RA415♂, RA418♂, RA447♂, RA463♀, RA497♂, RA503♂, RA555♂ (ZMUC); 1 ♂, Cerro Otto, elevation ca. 930 m, 5.xii.1981, Nielsen & Karsholt, genitalia slide no. RA409♂ (ZMUC); 1 ♀, Monte Tronador, elevation ca. 1100–1500 m, 6.xii.1981, Nielsen & Karsholt, genitalia slide no. RA466♀ (ZMUC), 1 ♂, Neuquén, Lago Tromen, elevation ca. 1000–1100 m, 1.xii.1981, Nielsen & Karsholt, genitalia slide no. RA401♂ (ZMUC); 1 ♂, S. M. de los Andes, Cerro Chapelco, elevation ca. 1400–1600 m, 1.xii.1981, Nielsen & Karsholt, genitalia slide no. RA442♂ (ZMUC).

Other material examined (not type-series). 1 ♂, ARGENTINA, Río Negro, S. C. de Bariloche, Cerro Otto, elevation ca. 930 m, 5.xii.1981, Nielsen & Karsholt, genitalia slide no. RA413♂ (ZMUC); 2 ♀, Pampa del Toro, elevation ca. 900 m, 30.x.–9.xi.1981, Nielsen & Karsholt, genitalia slide no. RA459♀ (ZMUC); 1 ♀, Colonia Suiza, elevation ca. 800 m, 7.xii.1981, Nielsen & Karsholt, genitalia slide no. RA457♀ (ZMUC); 1 ♀, Neuquén, Lágo Lacar, Pucar, elevation ca. 650 m, 28–29.xi.1981, Nielsen & Karsholt, genitalia slide no. RA305♀ (ZMUC); 1 ♀, Paso Puyehue, elevation ca. 1300 m, 10.xii.1981, Nielsen & Karsholt, genitalia slide no. RA455♀ (ZMUC) (see Remarks).

Etymology. The species name is derived from the Latin *purpurus* (purple) and *macula* (a spot) in reference to the purple apical spot of the forewing.

Remarks. The specimens which exibit some variation of genitalia or external characters were excluded from the type-series.

2. *Stigmella cana* Remeikis & Stonis, sp. nov.

(Figs 11–13, 41–44, 94–96)

Diagnosis. Externally *S. cana* is most similar to the uniformly colored *S. concreta* and *S. pseudoconcreta* but differs in the long antenna (flagellum consists up to 41 segments) and more greyish colour of the forewing. These adults which posses the purple spot on the forewing resemble a few other species of the *S. purpurimaculae* group, especially *S. truncata, S. sceptra* and *S. purpurimaculae*, which, in contrast to *S. cana*, usually are smaller and often with an orange or partially orange frontal tuft. In the male genitalia, the combination of the enlarged inner lobe of the valva, very short phallus and long (not truncate) lobes of uncus, separate the species from *S. truncata, S.*

sceptra and *S. purpurimaculae.* From *S. concreta* it differs in the simple shape of the gnathos and in the absence of lobes of the transtilla and in the absence of the rod-like chitization of the phallus; from *S. pseudoconcreta* it differs in the gnathos lacking anterior processes and in the simple chitization of the phallus, as well the dark brown (not orange) frontal tuft externally.

Male (Figs 11–13). Forewing length 2.3–2.6 mm; wingspan 5.1–5.7 mm. Head: palpi grey, glossy; frontal tuft dark greyish brown; collar white to greyish white; scape white; antenna longer than half length of forewing; flagellum with 35–41 segments, dark grey on upper side and underside. Thorax, tegulae and forewing uniform, dark grey with golden gloss, usually (but not always) with purplish -brown or brown apical spot; terminal and tornal cilia grey or dark grey; underside of forewing fuscous grey, without purple iridescence, spots or androconia. Hindwings and cilia grey to dark grey, with no androconia. Legs shiny, grey to dark grey on upper side and underside. Abdomen shiny, dark grey on upper side, grey to dark grey on underside; anal tufts short, greyish; anal plates grey.

Female. Forewing length 2.7 mm; wingspan 5.9 mm. Flagellum with 28–29 segments.

Male genitalia (Figs 41–44). Capsule longer (340–360 μm) than wide (235–250 μm). Vinculum with two large lateral (anterior) lobes; ventral plate of viculum short. Uncus with long caudal lobes (Figs 41, 42). Gnathos with two very narrow caudal processes with broadened basal parts (Fig. 41), central plate of gnathos forming a a narrow transverse bar. Valva (Figs 41, 42) 170–200 μm long, very broad (90–95 μm), with large chitinized and pointed apical process; inner lobe broadly rounded; transtilla without sublateral processes, rounded or angular at corners. Phallus (Figs 43, 44) 335–340 μm long, 140–145 μm broad; chitinization of phallus tube is partially reduced on distal 1/2–1/3; vesica with numerous small dentate (Figs 43, 44) and some small, spine-like cornuti (the latter in fewer number). Manica absent.

Female genitalia (Figs 94–96). Total length about 850 μm. Anterior apophyses very short (about 40 μm long), posterior much longer (about 175 μm) and very narrow. Vestibulum broad, without sclerites. Corpus bursae with folded distal part and broad, round basal half, without signa, sparsely covered with pectinations only on proximal part, and with 8–9 short thickened spines (Figs 95, 96) in the area where the folded part of corpus bursae extends into accessory sac. Accessory sac broad, short but not prominent (barely distinct); ductus spermathecae short, with about 2.5–3 convolutions, extended into very long (480–500 μm) and broad (about 175 μm) utriculus (Fig. 94). Abdominal tip very broad, blunt.

Bionomics. Some specimens were collected around *Nothofagus pumilio;* however there is insufficient evidence that this plant is the host-plant of *S. cana.* Adults fly in October–November. Otherwise unknown.

Distribution. This species occurs in the southern Andes (Argentina) at altitudes ca. 640–1300 m (see Material).

Type material. Holotype: ♂, ARGENTINA, Río Negro, S. C. de Bariloche, Cerro López, elevation ca. 1300 m, 13.x.1981, Nielsen & Karsholt, genitalia slide no. RA 495♂ (ZMUC).

Paratypes: 4 ♂, 1 ♀, ARGENTINA, Río Negro, S. C. de Bariloche, Cerro López, elevation ca. 1300 m, 13.x.–10.xi.1981, Nielsen & Karsholt, genitalia slide nos. RA417♂, RA424♂, RA445♂, RA461♀, RA499♂ (ZMUC); 3 ♂, 1 ♀, S. C. de Bariloche, Cerro Otto, elevation ca. 930 m, 12.x.1981, Nielsen & Karsholt, genitalia slide nos. RA414♂, RA427♂, RA428♂, RA507♀ (ZMUC); 1 ♂, CHILE, Osorno, Parque Nacional Puyehue, Antillanca, elevation ca. 1100–1300 m, 14.xi.1981, Nielsen & Karsholt, genitalia slide no. RA336♂ (ZMUC).

Other material examined (not type-series). 2 ♂, ARGENTINA, Río Negro, S. C. de Bariloche, Cerro López, elevation ca. 1300 m, 10.xi.1981, Nielsen & Karsholt, genitalia slide no. RA423♂ (ZMUC); 1 ♂, Pampa del Toro, elevation ca. 900 m, 30.x.1981, Nielsen & Karsholt, genitalia slide no. RA501♂ (ZMUC); 1 ♀, Neuquén, S. M. de los Andes, elevation ca. 640 m, 17–31.x.1981, Nielsen & Karsholt (ZMUC); 1 ♂, S. M. de los Andes, Piedra Trampul, elevation ca.1000 m, 15.x.1981, Nielsen & Karsholt, genitalia slide no. RA438♂ (ZMUC) (see Remarks).

Etymology. The species name is derived from the Latin *canus* (grey) in reference to the distinctly greyish tinge of the forewings.

Remarks. The specimens which exibit some variation of genitalia or external characters were excluded from the type-series.

3. *Stigmella truncata* Remeikis & Stonis, sp. nov.
(Figs 3, 14–16, 45–53, 97)

Diagnosis. Externally adults of this species resemble a few other species of the *S. purpurimaculae* group, especially *S. sceptra, S. purpurimaculae* and specimens of *S. cana* possessing a purple spot of the forewing. However, from the most similar *S. sceptra,* the species differs in the short, partially reduced phallus; from *S. purpurimaculae* in the distally narrowed (triangular) valva, the truncate lobes of the uncus, the shorter lobes of the vinculum, and the shorter phallus; from *S. cana* in the smaller size of the adults and shorter antenna, the distally narrowed (triangular, not bulged) valva, and the truncate lobes of the uncus.

Male (Figs 3, 14–16). Forewing length 1.8–2.2 mm; wingspan 4.1–4.9 mm. Head: palpi grey; frontal tuft usually entirely dark greyish brown, sometimes mixed: dark greyish brown on frons, yellowish orange on vertex; collar and scape yellowish cream to silvery whitish; antenna half the length of forewing or shorter; flagellum with 30–32 segments, dark greyish brown, strongly glossy, usually without purplish iridescence. Thorax, tegulae and forewing shiny, grey with strong golden gloss, with no fascia; apex brownish to dark brown, occassionally with some purplish iridescence; terminal and tornal cilia greyish brown to pale grey; underside of forewing fuscous brown, with no spots or androconia, occasionally with very weak purple iridescence. Hindwings grey to greyish brown on upper side and underside, with no androconia; their cilia greyish brown to grey. Legs brownish grey to fuscous grey on upper side and underside, with very strong gloss. Abdomen shiny, dark grey on upper side and underside; anal tufts short, greyish; anal plates grey.

Female. Forewing length about 2.5–2.7 mm; wingspan about 5.5–6.0 mm. Frontal tuft from entirely orange to mixed orange and (greyish brown) or entirely dark greyish brown. Flagellum with about 23 segments. Otherwise as in male.

Male genitalia (Figs 45–53). Capsule much longer (280–340 μm) than wide (175–195 μm). Vinculum with two triangular lateral (anterior) lobes; ventral plate of viculum very short in the middle. Uncus with short (truncate) caudal lobes (Figs 46, 50). Gnathos with two narrow caudal processes (Figs 47, 50), central plate of gnathos like a narrow transverse bar. Valva (Figs 45–47, 49, 51) 170–180 μm long, gradually narrowed towards apex (i.e. almost triangular), with very large chitinized and slightly pointed (almost straight) apical process; inner lobe weakly developed but often heavily papillated (Figs 49, 51); transtilla with short triangular and pointed sublateral processes. Phallus (Figs 48, 52, 53) 260–270 μm long, 110–115 μm broad; chitinization of phallus tube is partially reduced in distal 1/2–1/3; vesica with numerous small dentate (Fig. 53) and some small spine-like cornuti (the later form a minory). Manica absent.

Female genitalia (Fig. 97). Total length about 820 μm. Anterior apophyses very short (about 50 μm long), posterior apophyses much longer (about 130 μm) and very slender. Vestibulum broad, without sclerites. Corpus bursae with folded distal part and broad round basal part, without signa, sparsely covered with pectinations not only in proximal part but along the entire length, without thickened spines. Accessory sac broad, short but slightly prominent (barely distinct); ductus spermathecae short, with about 2 convolutions, extended into long (about 600 μm) and very broad (i.e. oval) utriculus (Fig. 97). Abdominal tip blunt, rounded.

Bionomics. Some specimens were collected around *Nothofagus pumilio;* however there is insufficient proof that this plant is the host-plant of *S. truncata.* Adults fly at light in October–December.

Distribution. This species occurs in the southern Andes (Argentina and Chile) at altitudes ca. 800–1600 m (see Material).

Type material. Holotype: ♂, ARGENTINA, Río Negro, S. C. de Bariloche, Pampa del Toro, elevation ca. 1000 m, 21.xi.1978, Mision Cientifica Danesa, genitalia slide no. RA433♂ (ZMUC).

Paratypes: 7 ♂, ARGENTINA, Río Negro, S.C. de Bariloche, Pampa del Toro, elevation ca. 900 m, 28.x.–9.xi.1981, Nielsen & Karsholt, genitalia slide nos. RA394♂, RA397♂, RA402♂, RA411♂, RA439♂, RA440♂, RA502♂ (ZMUC); 3 ♂, Cerro López, elevation ca. 1300 m, 13.x.–10.xi.1981, Nielsen & Karsholt, genitalia slide nos. RA425♂, RA426♂, RA443♂ (ZMUC); 3 ♂, Pampa del Toro, elevation ca. 1000 m, 21.xi.1978, Mision Cientifica Danesa, genitalia slide nos. RA400♂, RA404♂, RA429♂ (ZMUC); 2 ♂, Camino del Tronador, elevation ca. 800 m, 29.xi.1978, Mision Cientifica Danesa, genitalia slide nos. RA 392♂, RA 434♂ (ZMUC); 1 ♀, 39: Cerro Catedral, elevation ca. 1350–2050 m, 22.xi.1981, Nielsen & Karsholt, genitalia slide no. RA506♀ (ZMUC); 1 ♂, 1 ♀, Monte Tronador, elevation ca. 1100–1500 m, 6.xii.1981, Nielsen & Karsholt, genitalia slide nos. RA405♂, RA467♀ (ZMUC); 1 ♂, Neuquén, S. M. de los Andes, Cerro Chapelco, elevation ca. 1400–1600 m,

1.xii.1981, Leg. Nielsen & Karsholt, genitalia slide no. RA410♂ (ZMUC); 1 ♂, Piedra Trampul, elevation ca. 1000 m, 15.x.1981, Nielsen & Karsholt, genitalia slide no. RA431♂ (ZMUC); 2 ♂, 1 ♀, CHILE, Osorno, Parque Nacional Puyehue, Antillanca, elevation ca. 1100–1300 m, 14.xi.1981, Nielsen & Karsholt, genitalia slide nos. RA430♂, RA446♂, RA460♀ (ZMUC).

Other material examined (not type-series). 2 ♀, ARGENTINA, Río Negro, S. C. de Bariloche, Pampa del Toro, elevation ca. 1000 m, 21.xi.1978, Mision Cientifica Danesa, genitalia slide nos. RA450♀, RA458♀ (ZMUC); 3 ♂, 2 ♀, elevation ca. 900 m, 30.x.–23.xi.1981, Nielsen & Karsholt, genitalia slide nos. RA412♂, RA441♂, RA451♀, RA462♀, RA496♂ (ZMUC); 1 ♀, Cerro Otto, elevation ca. 930 m, 5.xii.1981, Nielsen & Karsholt, genitalia slide no. RA453♀ (ZMUC); 1 ♂, 1 ♀, Cerro López, elevation ca. 1300 m, 13.x.–10.xi 1981, Nielsen & Karsholt, genitalia slide nos. RA406♂, RA449♀ (ZMUC); 1 ♀, Monte Tronador, elevation ca. 1100–1500 m, 6.xii.1981, Nielsen & Karsholt, genitalia slide no. RA464♀ (ZMUC); 1 ♂, Neuquén, Paso Puyehue, elevation ca. 1300 m, 10.xii.1981, Nielsen & Karsholt, genitalia slide no. RA432♂ (ZMUC); 1 ♂, 14 km NW Confluencia Arroyo Córdoba, 740 m, 18.x.1981, Nielsen & Karsholt, genitalia slide no. RA395♂ (ZMUC); 1 ♂, CHILE, Osorno, Parque Nacional Puyehue, Antillanca, elevation ca. 1100–1300 m, 14.xi.1981, Nielsen & Karsholt, genitalia slide no. RA391♂ (ZMUC) (see Remarks).

Etymology. The species name is derived from the Latin *truncatus* (truncate) in reference to the distinctly short truncate lobes (processes) of the uncus.

Remarks. The specimens which exibit some variation of genitalia or external characters were excluded from the type-series.

4. *Stigmella sceptra* Remeikis & Stonis, sp. nov.

(Figs 4, 17–20, 54–59, 98)

Diagnosis. Externally the adults of this species resemble a few other species of the *S. purpurimaculae* group, especially *S. purpurimaculae* and *S. truncata.* However, in the male genitalia, the rod-like chitization of the phallus of *S. sceptra* is unique among the species of the *purpurimaculae* group. Additionally, *S. sceptra* clearly differs from the most similar *S. truncata* by the long slender phallus and longer vinculum; from *S. purpurimaculae* by the short lobes of uncus and triangular valva; from *S. cana, S. concreta* and *S. pseudoconcreta* by the triangular valva and long phallus; from *S. quadrata* by the narrow lobes of the uncus, triangular valva and significantly larger cornuti.

Male (Figs 17–20). Forewing length 2.0–2.2 mm; wingspan 4.4–4.9 mm. Head: palpi grey to glossy greyish cream; frontal tuft mixed: dark greyish brown on frons, yellowish orange on vertex; collar and scape yellowish cream to silvery whitish; antenna half the length of forewing or longer; flagellum with 33–34 segments, dark grey-brown, glossy, without purplish iridescence (or the iridescence is hardly visible). Thorax, tegulae and forewing shiny grey, with strong golden gloss, with no fascia; apex purplish brown or brown; terminal and tornal cilia greyish brown to grey; underside of forewing fuscous brown, with no spots or androconia, sometimes with very weak purple iridescence. Hindwings grey to greyish brown on upper side and underside, with no androconia; their cilia greyish brown to grey. Legs brownish grey to fuscous grey on upper side and underside, with very strong gloss. Abdomen shiny, dark grey on upper side and underside; anal tufts short, greyish; anal plates grey.

Female. Similar to male.

Male genitalia (Figs 54–59). Capsule much longer (about 370 µm) than wide (about 195 µm). Vinculum with two large, distally usually rounded lateral (anterior) lobes; ventral plate of viculum long. Uncus with short truncate caudal lobes (Figs 54, 55). Gnathos with two narrow caudal processes with gradually broadened basal parts (Fig. 55), central plate of gnathos forming a narrow transverse bar. Valva (Figs 54, 56) 175–180 µm long, gradually narrowed towards apex (almost triangular), with large, slightly curved and pointed apical process; inner lobe weakly developed; transtilla with very short triangular pointed sublateral processes. Phallus (Figs 57–59) very long (about 320 µm), 90–95 µm broad; chitinization of phallus tube is partially reduced on one side, while on the other a rod-like chitinization developed (Figs 57–59); vesica with mixture of numerous small dentate and almost same numerous small spine-like cornuti. Manica absent.

Female genitalia (Figs 4, 98). Total length about 730–926 µm. Anterior apophyses shorter than posterior ones (about 40–55 µm long in the narrow part); posterior apophyses about 140 µm long, very narrow. Vestibulum broad, without sclerites. Corpus bursae with folded distal part and broader, ovally-shaped basal part, without signa,

covered with pectinations (best visible in proximal part of bursae), without thickened spines. Accessory sac broad, very short and not prominent (barely distinct); ductus spermathecae short, with about 3–3.5 convolutions, extended into long (320–560 µm) and broad utriculus (equal or longer than corpus bursae). Abdominal tip broad and blunt.

Bionomics. Adults collected in October–November. Otherwise unknown.

Distribution. This species occurs in the southern Andes (Chile and Argentina) at altitudes ca. 900–1300 m (see Material).

Type material. Holotype: ♂, CHILE, Osorno, Parque Nacional Puyehue, Antillanca, elevation ca. 1100–1300 m, 14.xi.1981, Nielsen & Karsholt, genitalia slide no. RA435♂ (ZMUC).

Paratypes: 1 ♂, ARGENTINA, Río Negro, S. C. de Bariloche, Pampa del Toro, elevation ca. 900 m, 30.x.1981, Nielsen & Karsholt, genitalia slide no. RA436♂ (ZMUC).

Other material examined (not type-series). 1 ♂, 2 ♀, ARGENTINA, Río Negro, S. C. de Bariloche, Pampa del Toro, elevation ca. 1000 m, 21.xi.1978, Mision Cientifica Danesa, genitalia slide nos. RA448♀, RA465♀, RA500♂ (ZMUC); 2 ♀, Pampa del Toro, elevation ca. 900 m, 9–10.xi.1981, Nielsen & Karsholt, genitalia slide nos. RA452♀, RA456♀ (ZMUC); 1 ♀, Camino del Tronador, elevation ca. 800 m, 29.xi.1978, Mision Cientifica Danesa, genitalia slide no. RA 569♀ (ZMUC) (See Remarks).

Etymology. The species name is derived from the Latin *sceptrum* (a sceptre) in reference to the long rod-like sclerotization of the phallus.

Remarks. The specimens which exibit some variation of genitalia or external characters were excluded from the type-series.

5. *Stigmella concreta* Remeikis & Stonis, sp. nov.

(Figs 6, 21, 22, 60–64)

Diagnosis. Externally, its most similar to *S. pseudoconcreta* and the uniform specimens of *S. cana.* From *S. cana* it differs in the large lobes of the massive transtilla, the presence of anterior processes of the gnathos, and in the rod-loke chitization of phallus; from *S. pseudoconcreta* in the large lobes of massive transtilla, the broad rounded lobes of the vinculum, the rod-like chitization of the phallus, and in the dark brown tuft on the head.

Male (Fig. 21, 22). Forewing length 1.8–1.9 mm; wingspan 4.0–4.3 mm. Head: palpi grey to greyish white; frontal tuft dark greyish brown; collar and scape whitish; antenna half length of forewing or longer; flagellum with 28–31 segments, dark greyish brown on upper side and underside. Thorax: tegulae and forewing uniform, dark grey with golden gloss, without pattern and apical purple or brown spot; terminal and tornal cilia dark grey; underside of forewing brownish grey or grey, at certain angle of view with fuscous darkening along basal third of costal margin, with no androconia. Hindwings and its cilia grey to dark grey, with no androconia. Legs shiny, brownish grey to dark grey on upper side and underside. Abdomen shiny, dark grey on upper side, grey to dark grey on underside; anal tufts short, brown-cream; anal plates grey to greyish cream.

Female. Unknown.

Male genitalia (Figs 6, 60–64). Capsule longer (305–325 µm) than wide (175–190 µm). Vinculum with two large and broadly rounded lateral (anterior) lobes; ventral plate of viculum longer than usually in the species group, but deeply exhavated medially. Uncus with slender caudal lobes (Figs 61, 62). Gnathos with two narrow caudal and two anterior processes (Figs 60, 61), central plate of gnathos in the form of a very short, narrow, transverse bar. Valva (Figs 60, 61) 130–145 µm long, 65–70 µm broad, with large chitinized and slightly curved apical process; inner lobe broadly rounded; transtilla with massive transverse bar and very broad, rounded (lobe-like), sublateral processes. Phallus (Figs 6, 63, 64) 140–150 µm long, 105–110 µm broad; chitinization of phallus tube is partially reduced in distal 1/2–1/3, except for a rod-like plate on the right side; vesica with numerous small dentate (Fig. 6) and some small, spine-like cornuti (the latter comprise only a majority, about 75–85%). Manica absent.

Bionomics. Adults collected in late September. Otherwise unknown.

Distribution. This species occurs in the southern Andes (Argentina) at an altitude ca. 640 m (see Material).

Type material. Holotype: ♂, ARGENTINA: Neuquén, S. M. de los Andes, elevation ca. 640 m, 28.ix.1981, Nielsen & Karsholt, genitalia slide no. RA498♂ (ZMUC).

Paratypes: 2 ♂, same label data as holotype, genitalia slide nos. RA408♂, RA416♂ (ZMUC).

Etymology. The species name is derived from the Latin *concretus* (thick, componded) in reference to the massive transtilla with very large, lobe-like sublateral processes in the male genitalia.

6. *Stigmella pseudoconcreta* Remeikis & Stonis, sp. nov.
(Figs 5, 23, 24, 65–68)

Diagnosis. Externally this species is the most similar to *S. concreta* and the uniformly marked specimens of *S. cana.* From *S. cana* it differs in the shorter antenna, the orange frontal tuft, the presence of anterior processes of the gnathos, and the stronger chitinization of the phallus; from *S. concreta*, in the absence of sublateral lobes and a less massive transtilla, the narrowed lobes of the vinculum, the stronger chitization of the phallus, and in the orange tuft on the head (in *S. concreta* the tuft is always very dark).

Male (Fig. 23, 24). Forewing length about 2.0 mm; wingspan 4.5 mm. Head: palpi pale grey; frontal tuft greyish orange; collar and scape whitish; antenna longer than half the length of forewing; flagellum with about 33 segments, dark grey on upper side and underside. Thorax, tegulae and forewing uniform, dark grey with golden to silver gloss, without pattern, and apical purplish brown spot; apex of forewing and terminal cilia grey with some yellowish brown shading; tornal cilia grey; underside of forewing dark grey, with weak purplish iridescence and no androconia. Hindwings and its cilia grey on upper side and underside, with no androconia. Legs shiny, brownish grey, but greyish cream on underside and distaly. Abdomen dark grey; anal tufts short, brownish cream; anal plates greyish cream.

Female. Unknown.

Male genitalia (Figs 5, 65–68). Capsule longer (450–455 μm) than wide (225–230 μm). Vinculum with two large but pointed lateral (anterior) lobes. Uncus with long caudal lobes (slightly curved in Figs 65, 66). Gnathos with two long narrow caudal processes and two shorter, almost triangular anterior processes (Figs 66, 67); central plate of gnathos like a narrow transverse bar. Valva (Figs 65, 66) 175 μm long, 75 μm broad, with very large slightly curved and pointed apical process; inner lobe very broad and rounded; transtilla with tiny sublateral processes (Fig. 67) or without processes. Phallus (Figs 5, 68) 220–225 μm long, 120–125 μm broad; chitization of phallus tube is partially reduced on ventral side at distal 1/2; vesica with numerous small dentate (Fig. 5) and some small, spine-like cornuti (the latter comprise only 10–15% of all the cornuti). Manica absent.

Bionomics. Holotype collected in October. Otherwise unknown.

Distribution. This species occurs in the southern Andes (Argentina) at an altitude about 800 m (see Material).

Type material. Holotype: ♂, ARGENTINA, Río Negro, S. C. de Bariloche, Colonia Suiza, elevation ca. 800 m, 19.x.1981, Nielsen & Karsholt, genitalia slide no. RA505♂ (ZMUC).

Etymology. The species is named after the similar species, *S. concreta* **sp. nov.**

7. *Stigmella quadrata* Remeikis & Stonis, sp. nov.
(Figs 25, 26, 69–74)

Diagnosis. Externally adults of this species resemble a few other species of the *S. purpurimaculae* group, especially *S. concreta*, *S. pseudoconcreta*, and some specimens of *S.cana.* However, the broad angular lobes of the uncus, quadrate inner lobes of the valva, and the minute (almost invisible) cornuti in the male genitalia are unique, and which facilitate identification.

Male (Figs 25, 26). Forewing length 2.5–2.6 mm; wingspan 5.5–5.8 mm. Head: palpi grey; frontal tuft pale greyish brown (rubbed in the holotype and paratype); collar and scape whitish; antenna considerably longer than half the length of forewing; flagellum with 32 segments, greyish brown on upper side and underside. Thorax, tegulae and forewing uniform, pale brownish grey, with golden gloss, without spots; terminal cilia pale grey, tornal cilia cream-grey; underside of forewing fuscous grey, sometimes with very weak blues and purplish iridescence, without spots or androconia. Hindwings and cilia grey to pale grey, without androconia. Legs brownish grey to cream-grey on upper side and underside, glossy. Abdomen shiny, dark grey to grey on upper side, grey on underside; anal tufts short, greyish cream; anal plates greyish cream to cream.

Female. Unknown.

Male genitalia (Figs 69–74). Capsule longer (290–295 μm) than wide (195–200 μm). Vinculum with two short, triangular, lateral (anterior) lobes; ventral plate of viculum short. Uncus with short but broad (quadrate) caudal lobes (Figs 69, 70, 72). Gnathos with two robust (sturdy) caudal processes and without anterior ones (Figs 69, 70, 72), central plate of gnathos broader than usualy in the species group. Valva (Figs 69, 72) 155–160 μm long,

very broad (75–80 μm), with very large chitinized, curved and pointed apical process; inner lobe short and very broad (almost quadrate); transtilla with short slender and pointed sublateral processes (Figs 69, 71). Phallus (Figs 72–74) 180–185 μm long, 80–85 μm broad; chitinization of phallus tube is slightly reduced in distal 1/10; cornuti (in total, ca. 100) very small, almost invisible, mostly dentate (Fig. 74), some small and spine-like. Manica absent.

Bionomics. Adults collected in November. Otherwise unknown.

Distribution. This species occurs in the southern Andes (Argentina) at an altitude ca. 750 m (see Material).

Type material. Holotype: ♂, ARGENTINA, Neuquén, Lágo Lacar, Pucar, elevation ca. 750 m, 10.xi.1978, Mision Cientifica Danesa, slide no. RA380♂ (ZMUC). Paratypes: 1 ♂, same label data as holotype, genitalia slide no. RA381♂ (ZMUC).

Etymology. The species name is derived from the Latin *quadratus* (squared/square) in reference to the quadrate, short but broad caudal lobes of the uncus, also the quadrate inner lobe of the valva in the male genitalia.

Species not attributed to a species group

8. *Stigmella semilactea* Remeikis & Stonis, sp. nov.
(Figs 27, 28, 75–78, 99–101)

Diagnosis. Externally adults of this species can be recognized by the sparsely distributed, milky-whitish scales on the dark brown forewing. The combination of the short phallus, short lobes of vinculum, triangular lobes of the uncus and the milky-whitish scales of the forewing, separate the species from all other *Stigmella* species.

Male (Figs 27, 28). Forewing length 2.1–2.8 mm; wingspan 4.5–6.3 mm. Head: palpi greyish cream to grey; frontal tuft dark, greyish brown, sometimes fused with some cream or orangish cream, piliform scales; collar cream to whitish; scape cream or whitish, sometimes with a few greyish scales; antenna about half the length of forewing; flagellum with 29–34 segments, brownish grey to grey on upper side, greyish cream on underside. Thorax and tegulae greyish brown to grey, with some greyish cream scales. Forewing with no fascia, irrorated with dark grey brown and milky-whitish scales (pale or rubbed specimens appear less irrorated, more grey-brown, but with some whitish scales); the whitish scales, especially in darker specimens, most distinctive in apical half of forewing; terminal cilia greyish cream, tornal cilia grey; underside of forewing dark grey brown, sometimes with weak purple or blue iridescence, with no spots or androconia. Hindwings and cilia pale greyish brown on upper side and underside, with no androconia. Legs brownish grey on upper side, greyish cream on underside. Abdomen dark-grey to grey on upper side, grey to cream on underside; anal tufts short, cream to greyish cream; anal plates cream to brownish cream.

Female. Forewing length 2.6–3.0 mm; wingspan 5.7–6.5 mm. Frontal tuft greyish brown to pale orange. Flagellum with 28–30 segments. Otherwise as male.

Male genitalia (Figs 75–78). Capsule rounded, slightly longer (325–330 μm) than wide (240–245 μm). Vinculum with two short and rounded (sometimes triangular) lateral (anterior) lobes. Uncus with long, distally gradually narrowed (amost triangular) caudal lobes (curved and therefore less visible in figs 75, 76). Gnathos with two very narrow caudal processes and lateral broad central plate (Fig. 76). Valva (Figs 75, 76) 165–170 μm long, 85–90 μm broad, with slender apical process; inner lobe of valva broad, slightly angular distally; transtilla without sublateral processes (fig. 76). Phallus (Figs 77, 78) 245–250 μm long, 130–135 μm broad; chitinization of phallus tube is partially reduced in distal half; vesica with numerous small spine-like or small blunt cornuti (but never dentate ones). Manica absent.

Female genitalia (Figs 99–101). Total length about 1100–1275 μm. Anterior apophyses very short (about 20 μm) and blunt; posterior apophyses long (about 135–165 μm) and very slender. Vestibulum narrow, without sclerites. Corpus bursae with folded distal part and broader, oval-shaped basal part, without signa, densily covered with pectinations over entire length (Figs 99, 100), without spines. Accessory sac broad, but very short but not prominent (barely distinct); ductus spermathecae long, with about 2.5–3 convolutions, not extended into large utriculus (as in the *purpurimaculae* group). Abdominal tip broad and blunt.

Bionomics. Some specimens were collected around *Colletia spinosissima* and *Discaria serratifolia* (both Rhamnaceae); however, there is insufficient proof that these plants are the hosts of *S. semilactea*. Adults fly in late September–December and February. Otherwise unknown.

Distribution. This species occurs in the southern Andes (Argentina and Chile) at altitudes ca. 350–1000 m (see Material).

Type material. Holotype: ♂, ARGENTINA, Neuquén, S. M. de los Andes, Piedra Trampul, elevation ca. 1000 m, 15.x.1981, Nielsen & Karsholt, genitalia slide no. RA512♂ (ZMUC).

Paratypes: 3 ♂, 1 ♀, ARGENTINA, Río Negro, S. C. de Bariloche, Colonia Suiza, elevation ca. 810 m, 9.xii.–31.xii.1978, Mision Cientifica Danesa, genitalia slide nos. RA360♂, RA528♂, RA571♂ (ZMUC); 4 ♂, 3 ♀, elevation ca. 800 m, 19.x.–22.xii.1981, Nielsen & Karsholt, genitalia slide nos. RA338♂, RA454♀, RA509♀ (ZMUC); 8 ♂, 1 ♀, Neuquén, S. M. de los Andes, elevation ca. 640 m, 28.ix.–26.xi.1981, Nielsen & Karsholt, genitalia slide nos. RA341♀, RA347♂, RA350♂, RA369♂, RA378♂, RA517♂, RA570♂ (ZMUC); 1 ♂, Lágo Lacar, Pucar, elevation ca. 650 m, 28–29.xi.1981, Nielsen & Karsholt, genitalia slide no. RA521♂ (ZMUC); 1 ♂, Chubut, Esquel, elevation ca. 550 m, 1.i.1982, Nielsen & Karsholt, genitalia slide no. RA343♂ (ZMUC).

Other material examined (not type-series). 1 ♀, ARGENTINA, Río Negro, S. C. de Bariloche, Colonia Suiza, elevation ca. 810 m, 4.xii.1978, Mision Cientifica Danesa (ZMUC); 1 ♂, elevation ca. 810 m, 9.i.1979, Mision Cientifica Danesa, genitalia slide no. RA377♂ (ZMUC); 5 ♀, elevation ca. 800 m, 3.ii.–24.xii.1981, Nielsen & Karsholt, genitalia slide nos. RA352♀, RA532♀ (ZMUC);1 ♀, Chubut, Esquel, Lago Menéndez, Sagrio Puerto, elevation ca. 550 m, 21.ii.1979, Mision Cientifica Danesa, genitalia slide no. RA573♀ (ZMUC); 1 ♀, Neuquén, Lágo Lacar, Pucar, elevation ca. 650 m, 27.xii.1981, Nielsen & Karsholt, genitalia slide no. RA511♀ (ZMUC); 1 ♂, CHILE, Osorno, Parque Nacional Puyehue, Anticura, elevation ca. 350 m, 18.xi.1981, Nielsen & Karsholt (ZMUC); 1 ♀, Aguas Calientes, elevation ca. 450 m, 12.xii.1981, Nielsen & Karsholt (ZMUC) (See Remarks).

Etymology. The species name is derived from the Latin *semi* (semi-/half-) and *lacteus* (milky, milk-white) in reference to the milk-white scales sparsely distributed on the darker forewing.

Remarks. The specimens which exibit some variation of genitalia or external characters were excluded from the type-series.

9. *Stigmella brutea* Remeikis & Stonis, sp. nov.

(Figs 29, 79, 80, 102)

Diagnosis. Despite the grey, irrorated with dark brown grey forewing, a character very common for many *Stigmella* species, this species posseses also unique male genitalia characters: the small valva with exceptionally long and straight apical process, the rounded phallus with numerous small spine-like and 6 broad and large cornuti.

Male (Fig. 29). Forewing length about 2.9 mm; wingspan about 6.4 mm. Head: palpi grey to dark grey; frontal tuft orange-beige; collar and scape cream; antenna longer than half the length of forewing; flagellum about 38 segments, dark grey on upper side and underside. Thorax, tegulae and forewing grey, irrorated with dark brown grey scales (especially distinct on apical half of forewing); forewing with no fascia; terminal and tornal cilia dark grey; underside of forewing greyish brown with short basal row of dark greyish brown chaetae along costal margin. Hindwings and cilia dark grey on upper side and underside, with no androconia. Legs dark grey to fuscous on upper side, grey to cream-grey on underside. Abdomen dark grey to grey on upper side and underside; anal tufts short, dark grey; anal plates greyish cream.

Female. Similar to male.

Male genitalia (Figs 79, 80). Capsule slender, longer (325–330 μm) than wide (185–190 μm). Vinculum with two long and very slender lateral (anterior) lobes. Uncus with short blunt lobes. Gnathos with two very narrow caudal processes and very slender transverse bar (Fig. 79). Valva 185–190 μm long, 65–70 μm broad, with very long and straight apical process; inner lobe of valva small, slightly angular; transtilla with weakly defined trianglar, sublateral processes. Phallus rounded (Fig. 80) about 180 μm long, 130 μm broad; chitinization of phallus tube is partially reduced in distal half; vesica with numerous various small, spine-like and 6 broad, large cornuti (but never with dentate ones). Manica absent.

Female genitalia (Fig. 102). Total length about 970 μm. Anterior apophyses long (about 125 μm) and slender; posterior apophyses very long (about 170–185 μm) and very slender. Vestibulum narrow, without sclerites. Corpus bursae narrowed (about 140 μm broad) in distal 1/3 and very broad (305 μm), oval-shaped on basal 2/3, without signa, covered with pectinations over entire length, without spines. Accessory sac indistinct or absent; ductus

spermathecae long, with about 3.5 weakly developed ("shallow") convolutions, not extended into large utriculus (as in the *purpurimaculae* group). Abdominal tip broad, truncate.

Bionomics. A few specimens were collected around *Colletia spinosissima* (Rhamnaceae); however there is insufficient proof that this plant is the host of *S. brutea*. Adults fly in November–December. Otherwise unknown.

Distribution. This species occurs in the southern Andes (Argentina) at altitudes ca. 650–750 m (see Material).

Type material. Holotype: ♂, ARGENTINA, Neuquén, Lágo Lacar, Pucar, elevation ca. 650 m, 27.xii.1981, Nielsen & Karsholt, genitalia slide no. RA332♂ (ZMUC). Paratypes: 3 ♀, ARGENTINA, Neuquén, Lágo Lacar, Pucar, elevation ca. 750 m, 10.xi.1978, Mision Cientifica Danesa, slide nos. RA371♀, RA372♀, RA386♀ (ZMUC); 1 ♀, elevation ca. 650 m, 27.xii.1981, Nielsen & Karsholt (ZMUC).

Other material (not type). 1 ♀, ARGENTINA, Neuquén, Lágo Lacar, Pucar, elevation ca. 750 m, 10.xi.1978, Mision Cientifica Danesa, slide no. RA384♀ (ZMUC) (The specimen exibits some variation of genitalia and external characters and therefore was excluded from the type-series).

Etymology. The species name is derived from the Latin *bruteus* (brutal) in reference to the unusually long, apical process of the valva in the male genitalia.

10. *Stigmella pseudodigitata* Remeikis & Stonis, sp. nov.

(Figs 30, 81–90)

Diagnosis. Despite the uniformly pale grey to brown forewing, a character very common for many *Stigmella* species, this species posseses unique male genitalia characters: the digitate group of four cornuti in the phallus and the undivided, distally narrowed uncus.

Male (Fig. 30). Forewing length 2.7–3.2 mm; wingspan 6.0–7.0 mm. Head: palpi cream-grey; frontal tuft pale orange (usually) to dark greyish brown (occasionally); collar and scape greyish white or cream-white (usually) to cream-grey (occasionally); antenna considerably longer than half the length of forewing; flagellum with 33–35 segments, pale grey to brownish grey on upper side and underside. Thorax, tegulae and forewing uniform, pale grey (usually) to brownish grey (occasionally), with weak or strong golden gloss, without apical spots; terminal and tornal cilia grey to brownish grey; underside of forewing dark grey to brownish grey, without purple iridescence, spots or androconia. Hindwings and their cilia pale grey to brownish grey, without androconia. Legs glossy, cream-grey with darkenings to entirely brownish grey on upper side and underside. Abdomen shiny, grey to dark grey on upper side, grey on underside; anal tufts short, cream to cream-grey or grey; anal plates cream to grey.

Female. Unknown.

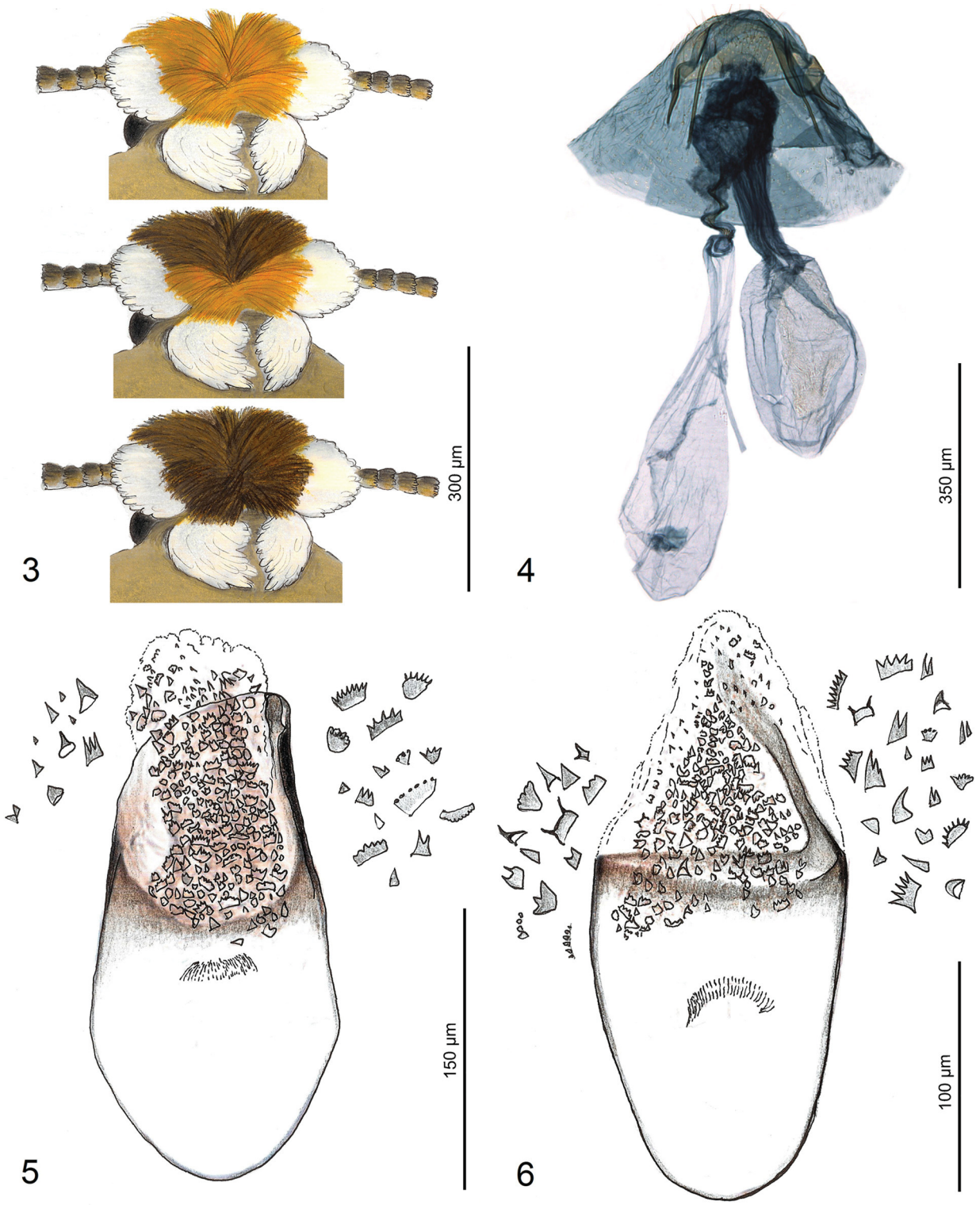
Male genitalia (Figs 81–90). Capsule longer (330–335 μm) than wide (220–225 μm). Vinculum with two triangular (anterior) lobes. Uncus gradually tapering towards distal end (Figs 81, 83–86, 89, 90), without lateral lobes. Gnathos with two caudal processes which can slightly vary and merge at bases (Figs 81, 86, 88). Valva 175–185 μm long, 75–80 μm broad, with long and curved apical process; inner lobe of valva large and rounded; transtilla usually without sublateral processes (Figs 87, 90) or these processes are minute (genitalia slide no. RA516, holotype). Phallus (Figs 82, 89, 90) 225–250 μm long, 90–130 μm broad; chitinization of phallus tube is partially reduced on distal 1/5; vesica with one very large, curved cornutus, a "digitate" group of four cornuti (see fig. 82), and more than 100 minute, spine-like cornuti (but never with dentate ones as in the *purpurimaculae* group). Manica absent.

Bionomics. Adults collected in late September–December and January. Otherwise unknown.

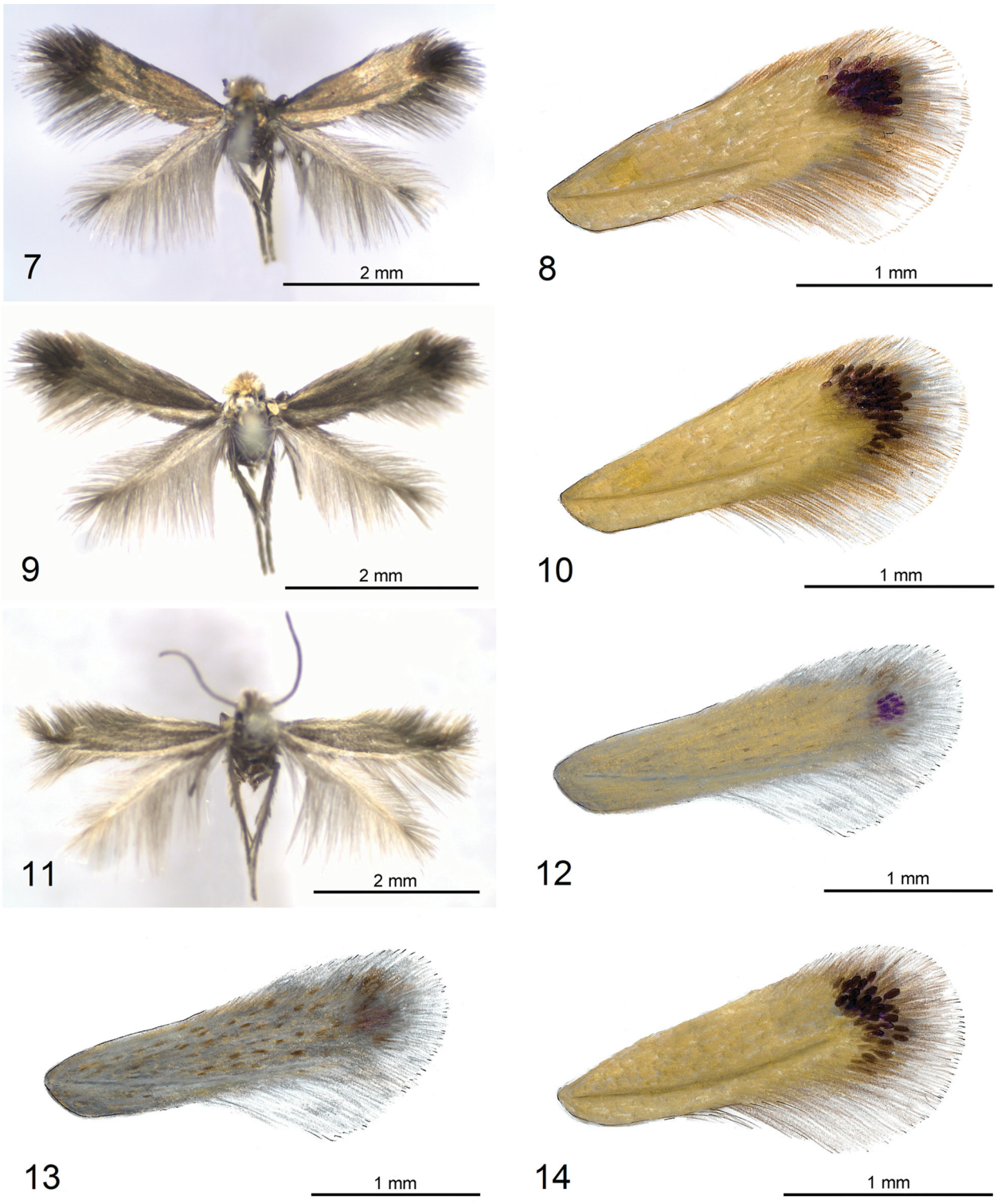
Distribution. It occurs in the Patagonian Andes (Argentina) at altitudes ca. 250–810 m (see Material).

Type material. Holotype: ♂, ARGENTINA, Río Negro, S. C. de Bariloche, Colonia Suiza, elevation ca. 810 m, 5.xi.1978, Mision Cientifica Danesa, genitalia slide no. RA516♂ (ZMUC). Paratypes: 3 ♂, ARGENTINA, Río Negro, S. C. de Bariloche, Colonia Suiza, elevation ca. 810 m, 13.xi.–24.xii.1978, Mision Cientifica Danesa, genitalia slide nos. RA361♂, RA363♂, RA373♂ (ZMUC); 3 ♂, elevation ca. 800 m, 27.x.–3.xii.1981, Nielsen & Karsholt, genitalia slide nos. RA355♂, RA390 (ZMUC); 6 ♂, Neuquén, S. M. de los Andes, elevation ca. 640 m, 29.ix.–15.xi.1981, Nielsen & Karsholt, genitalia slide nos. RA365♂, RA367♂, RA368♂, RA375♂, RA376♂, RA572♂ (ZMUC); 1 ♂, Santa Cruz, Lago Argentino, Penín s Magallanes, elevation ca. 250 m, 11.i.1979, Mision Cientifica Danesa, genitalia slide no. RA354♂ (ZMUC).

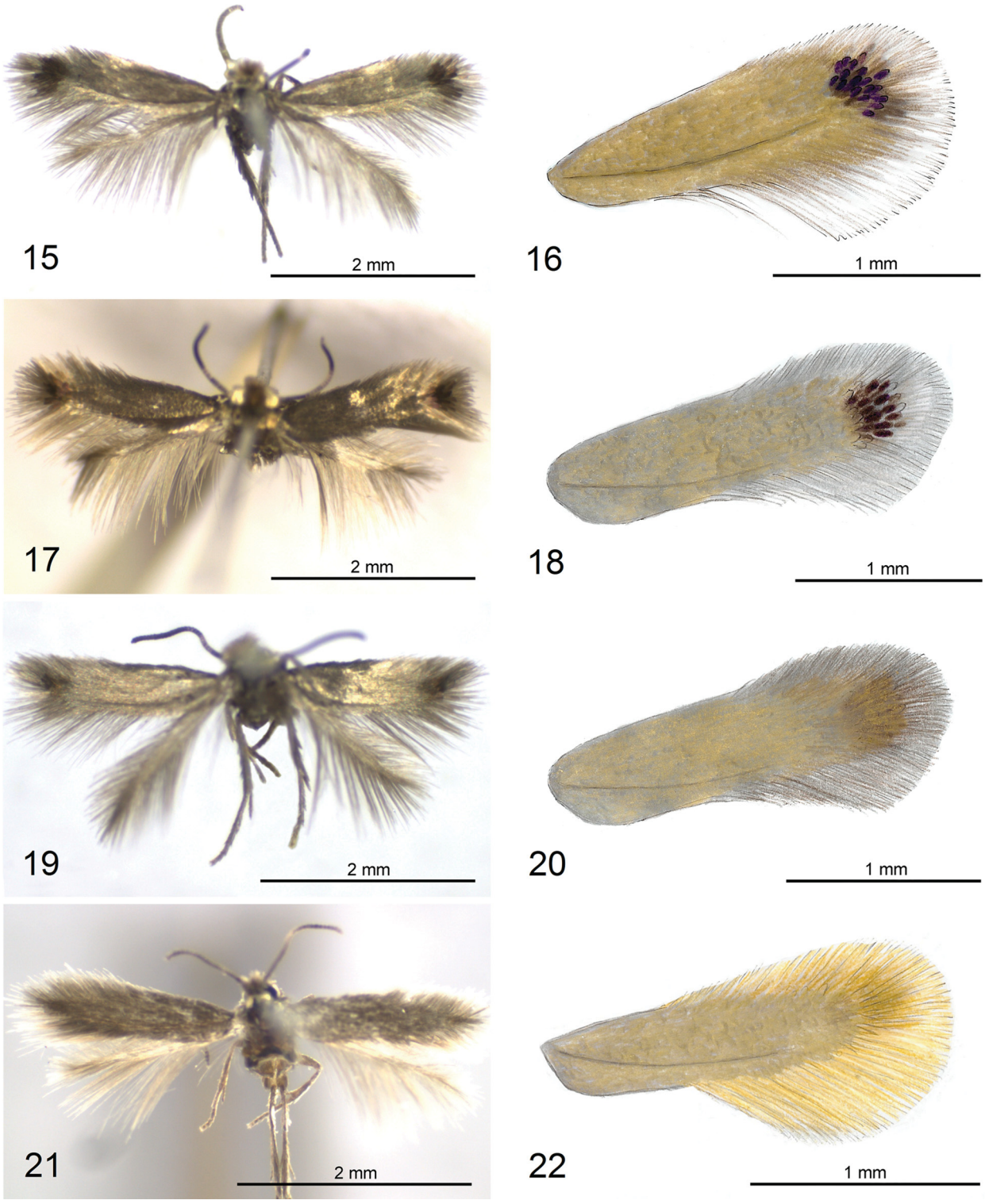
Etymology. The species name is derived from the Latin *digitatae* (digitate) in reference to the digitate group of four cornuti in the phallus.



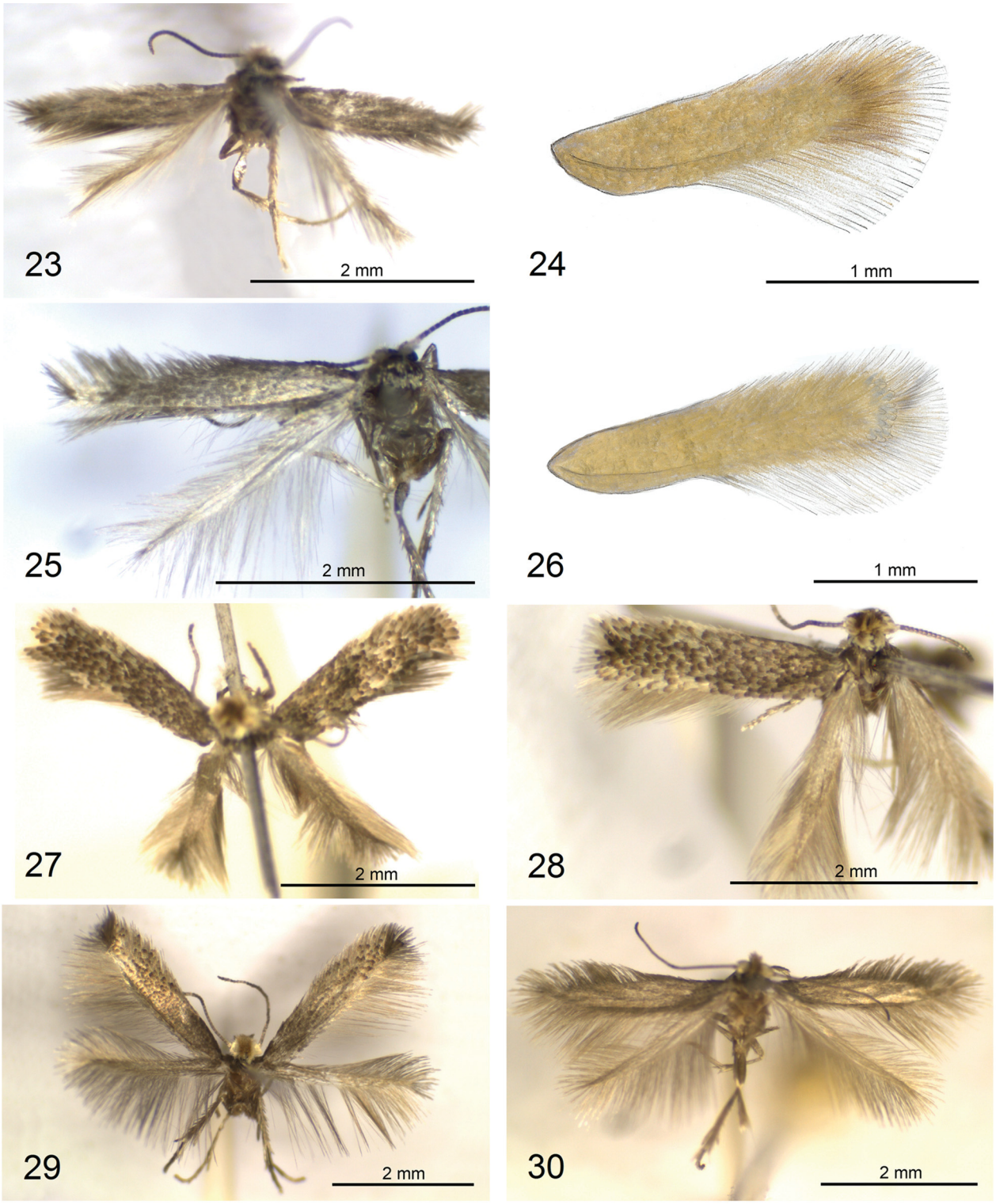
FIGURES 3–6. Details of morphology of the newly designated *Sigmella purpurimaculae* species group. 3, the color variation of the frontal tuft in *Stigmella truncata* Remeikis & Stonis, **sp. nov.**; 4, female genitalia of non type-series specimen of *S. sceptra* Remeikis & Stonis, **sp. nov.**, genitalia slide no. RA452; 5, phallus of *S. pseudoconcreta* Remeikis & Stonis, **sp. nov.**, holotype, genitalia slide no. RA 505; 6, phallus of *S. concreta* Remeikis & Stonis, **sp. nov.**, holotype, genitalia slide no. RA498.



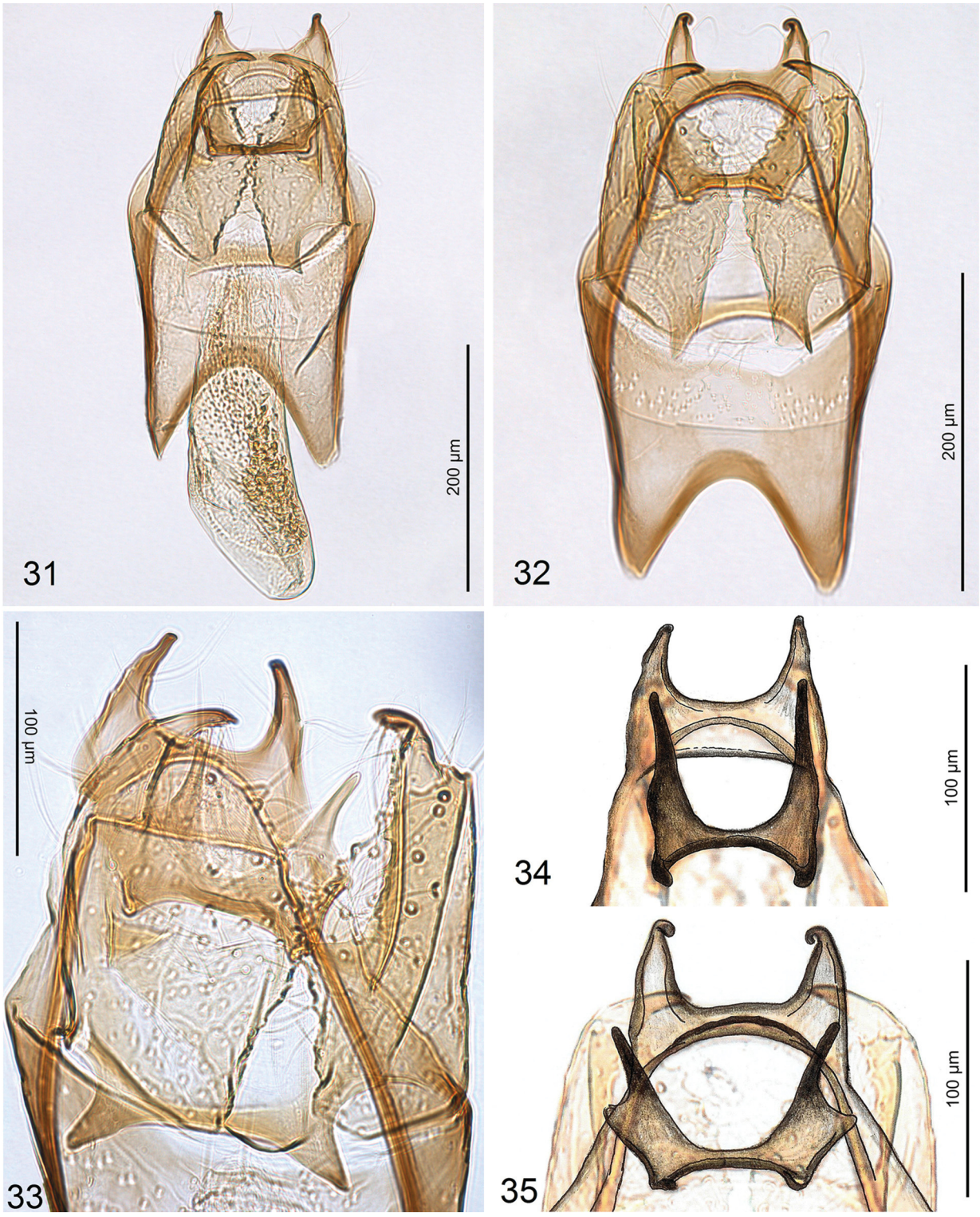
FIGURES 7–14. Adults of new *Stigmella* spp. 7, *S. purpurimaculae* Remeikis & Stonis, **sp. nov.**, holotype; 8, same, paratype; 9, same, other image of the holotype; 10, same, other paratype specimen; 11, *S. cana* Remeikis & Stonis, **sp. nov.**, holotype; 12, same, paratype; 13, same, other paratype specimen; 14 *S. truncata* Remeikis & Stonis, **sp. nov.**, paratype.



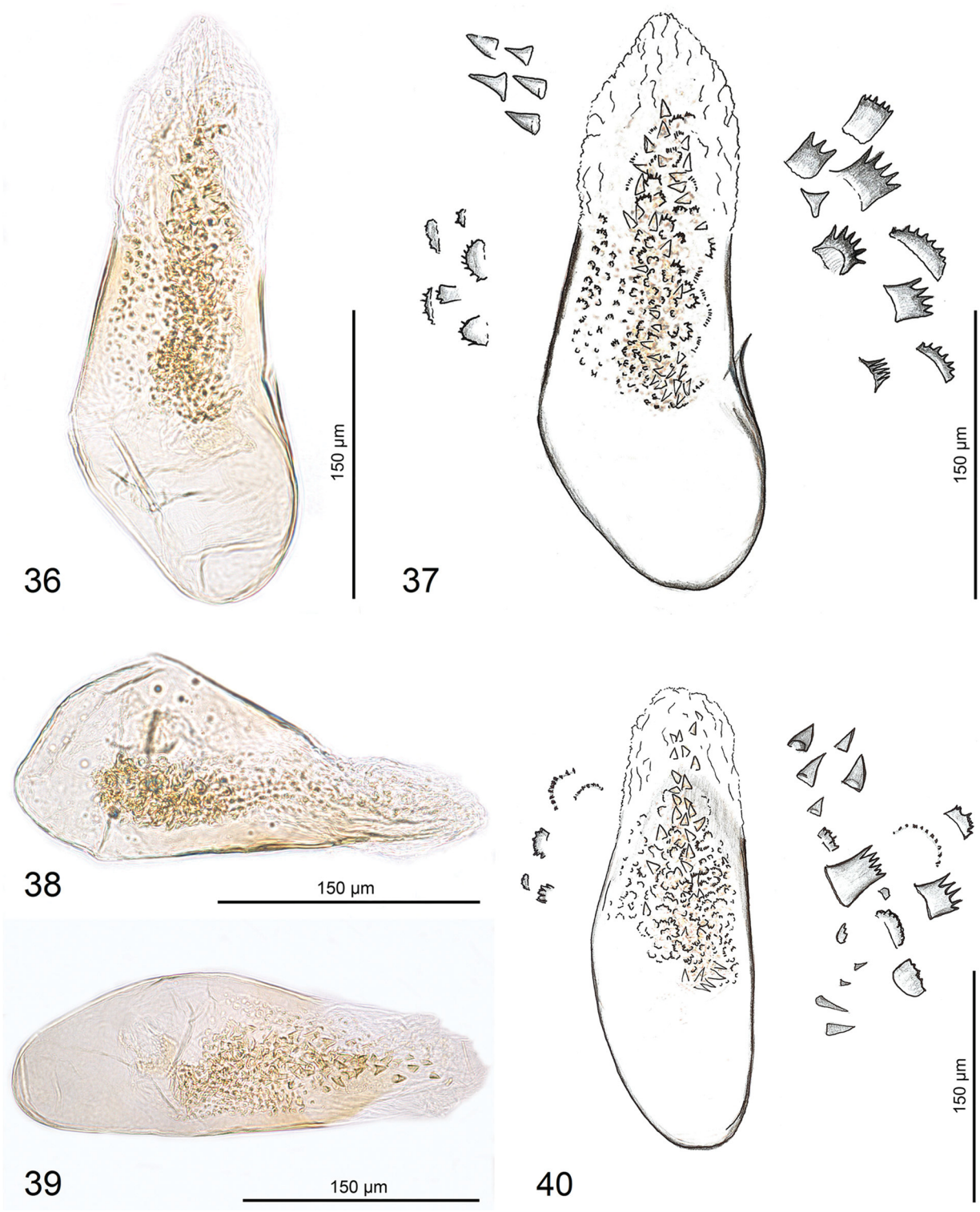
FIGURES 15–22. Adults of new *Stigmella* spp. 15, *S. truncata* Remeikis & Stonis, **sp. nov.**, holotype; 16, same, paratype; 17, S. *sceptra* Remeikis & Stonis, **sp. nov.**, holotype; 18, same; 19, same, paratype; 20, same; 21, *S. concreta* Remeikis & Stonis, **sp. nov.**, paratype; 22, same.



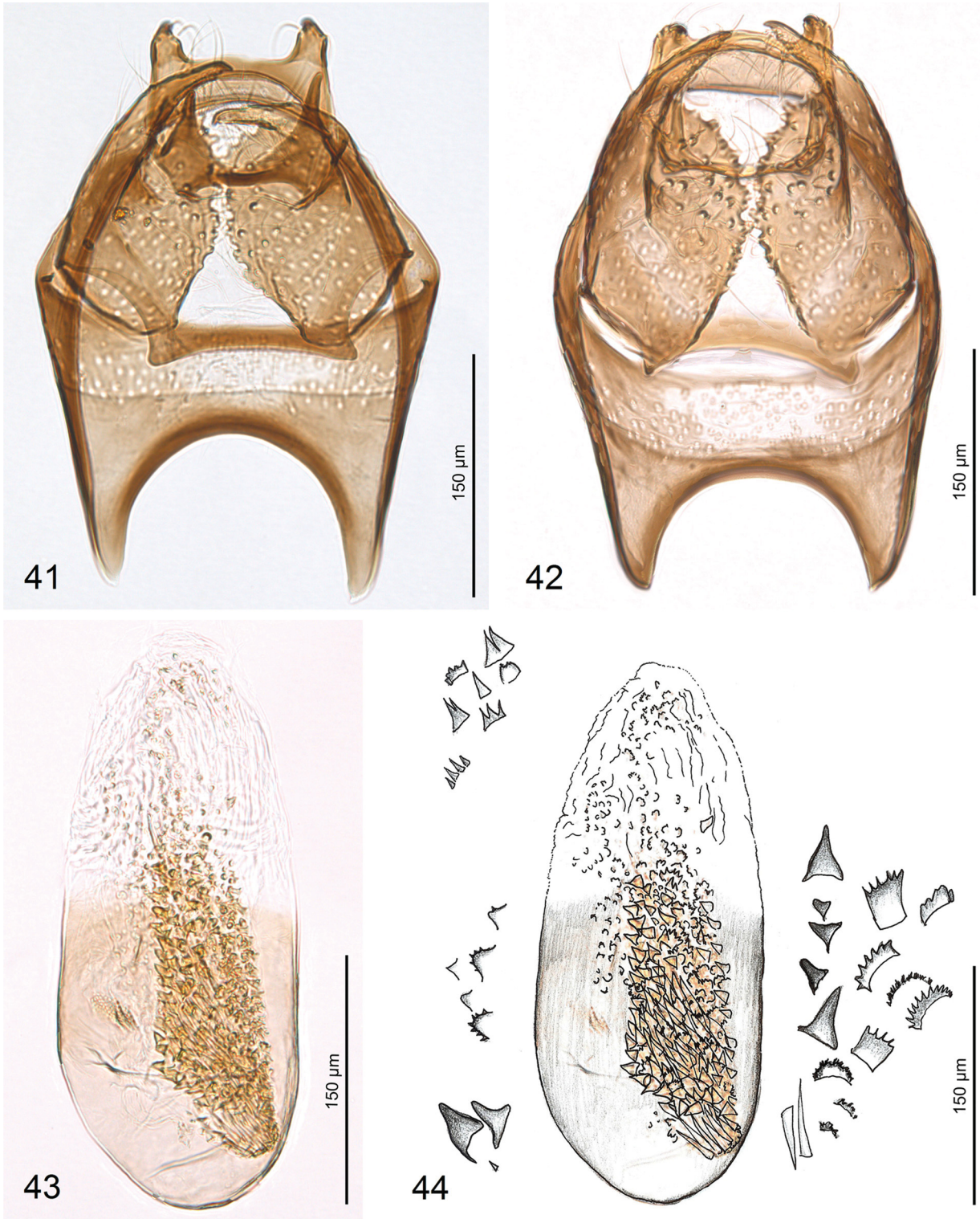
FIGURES 23–30. Adults of new *Stigmella* spp. 23, *S. pseudoconcreta* Remeikis & Stonis, **sp. nov.**, holotype; 24, same; 25, *S. quadrata* Remeikis & Stonis, **sp. nov.**, holotype; 26, same; 27, *S. semilactea*, Remeikis & Stonis, **sp. nov.**, holotype; 28, same, paratype; 29, *S. brutea* Remeikis & Stonis, **sp. nov.**, holotype; 30, *S. pseudodigitata* Remeikis & Stonis, **sp. nov.**, holotype.



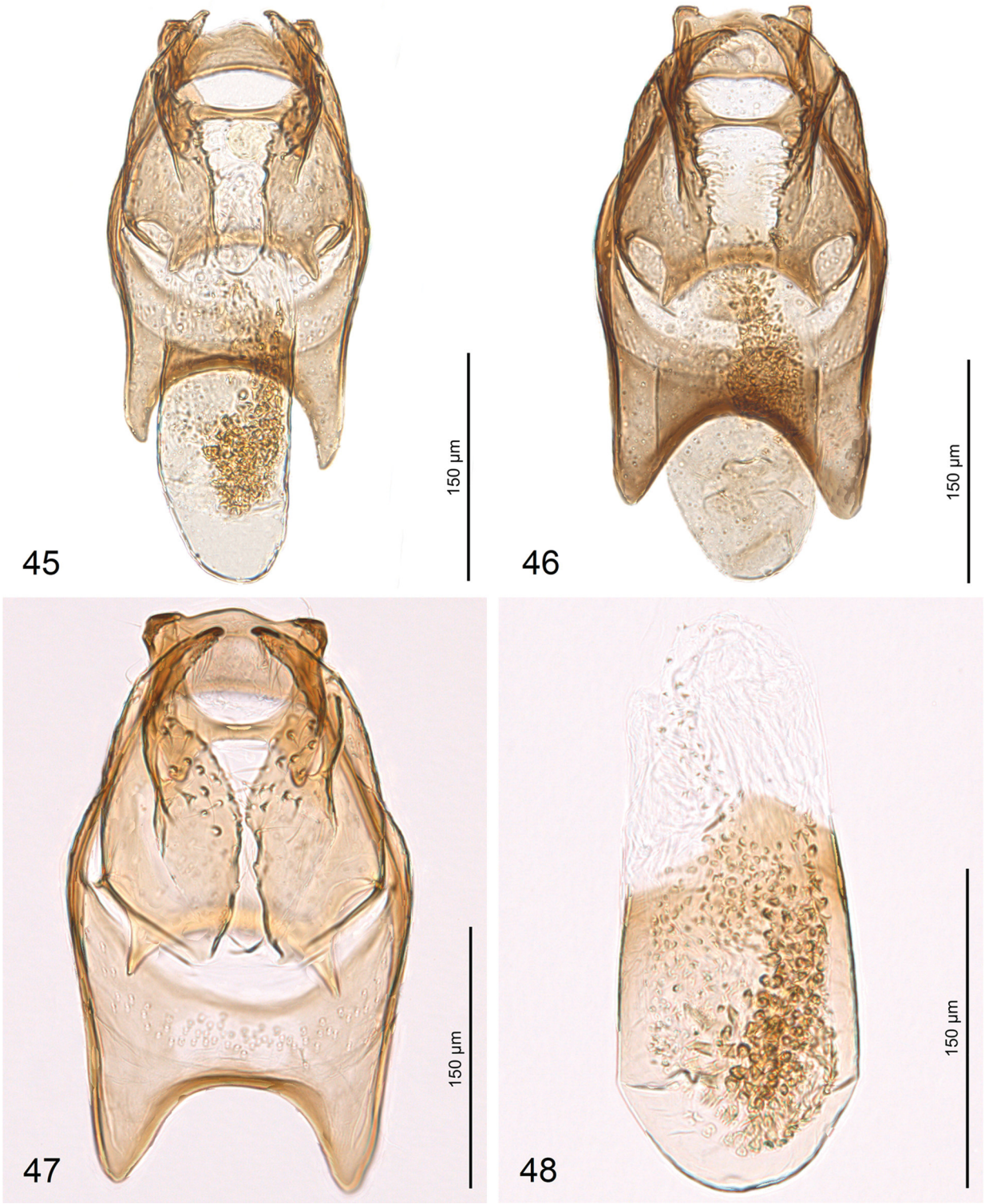
FIGURES 31–35. Male genitalia of *Stigmella purpurimaculae* Remeikis & Stonis, **sp. nov.** 31, holotype, genitalia slide no. RA393; 32, paratype, genitalia slide no. RA398; 33, same, genitalia slide no. RA503; 34, same, uncus and gnathos, genitalia slide no. RA396; 35, same, genitalia slide no. RA398.



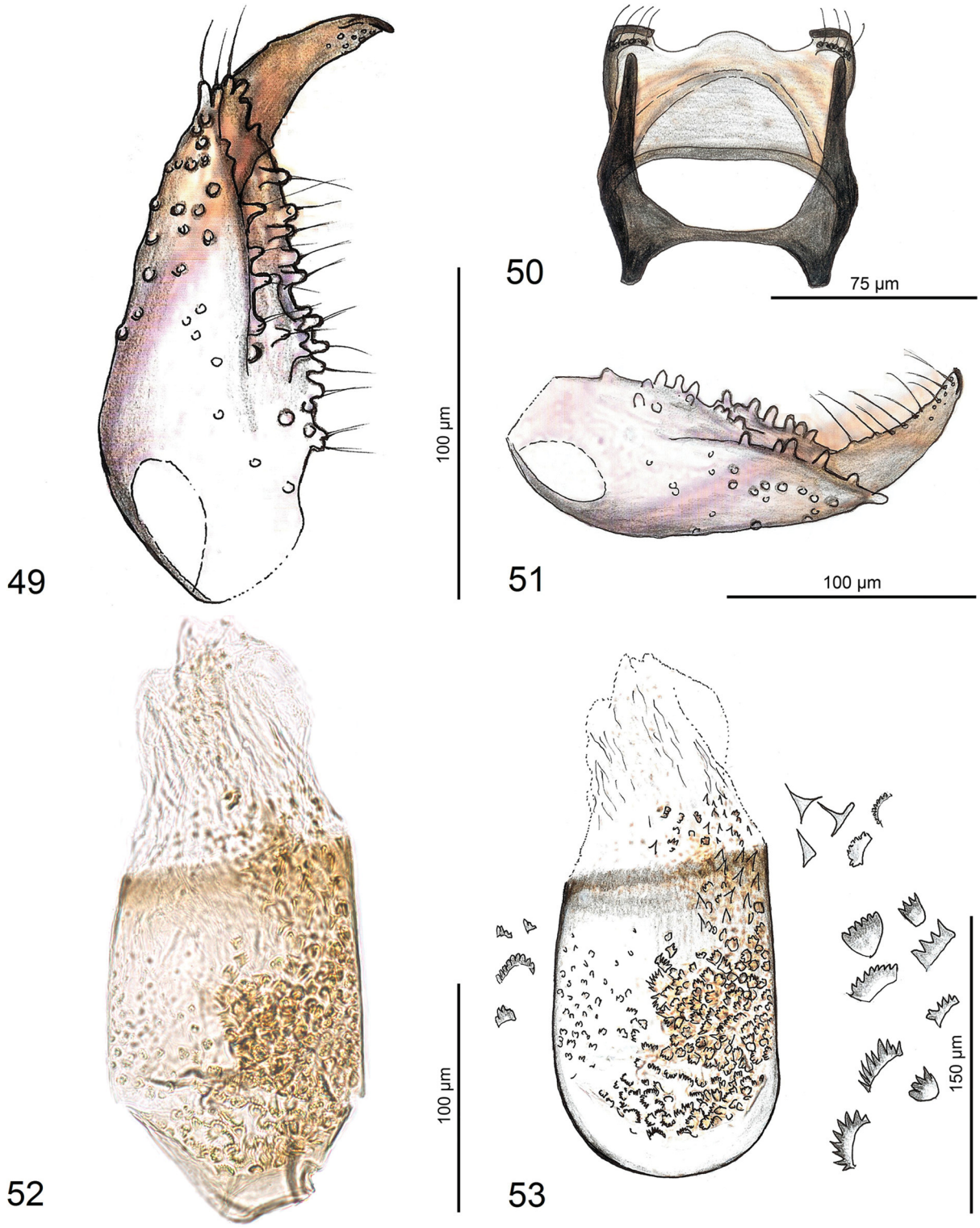
FIGURES 36–40. Phallus of paratypes of *Stigmella purpurimaculae* Remeikis & Stonis, **sp. nov.** 36, genitalia slide no. RA409; 37, same, artistic reconstruction with cornuti enlarged; 38, genitalia slide no. RA396; 39, genitalia slide no. RA497; 40, same, artistic reconstruction with cornuti enlarged.



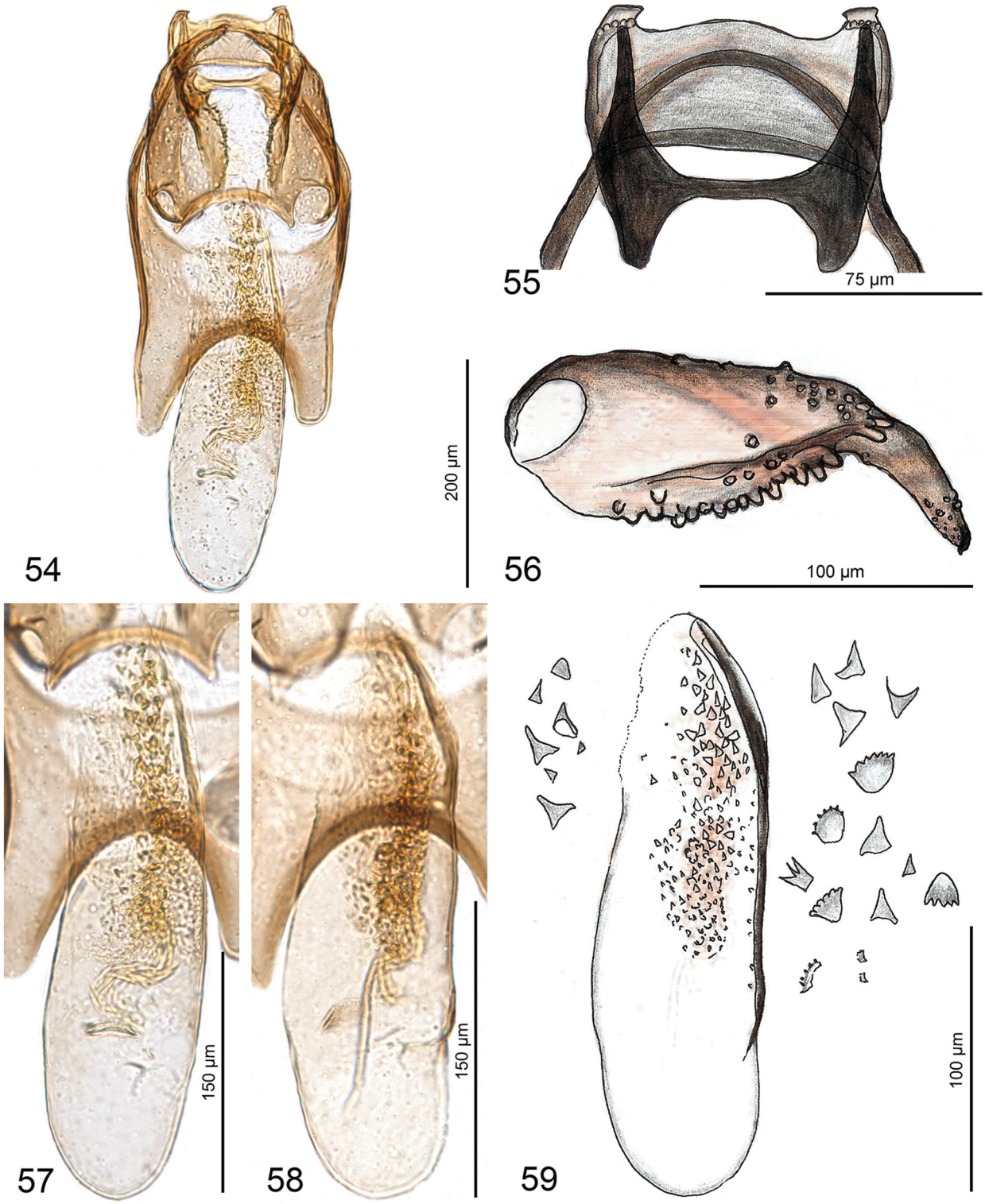
FIGURES 41–44. Male genitalia of *Stigmella cana* Remeikis & Stonis, **sp. nov.** 41, genital capsule, paratype, genitalia slide no. RA414; 42, same, holotype, genitalia slide no. RA495; 43, phallus, holotype, genitalia slide no. RA495; 44, same, artistic reconstruction with cornuti enlarged.



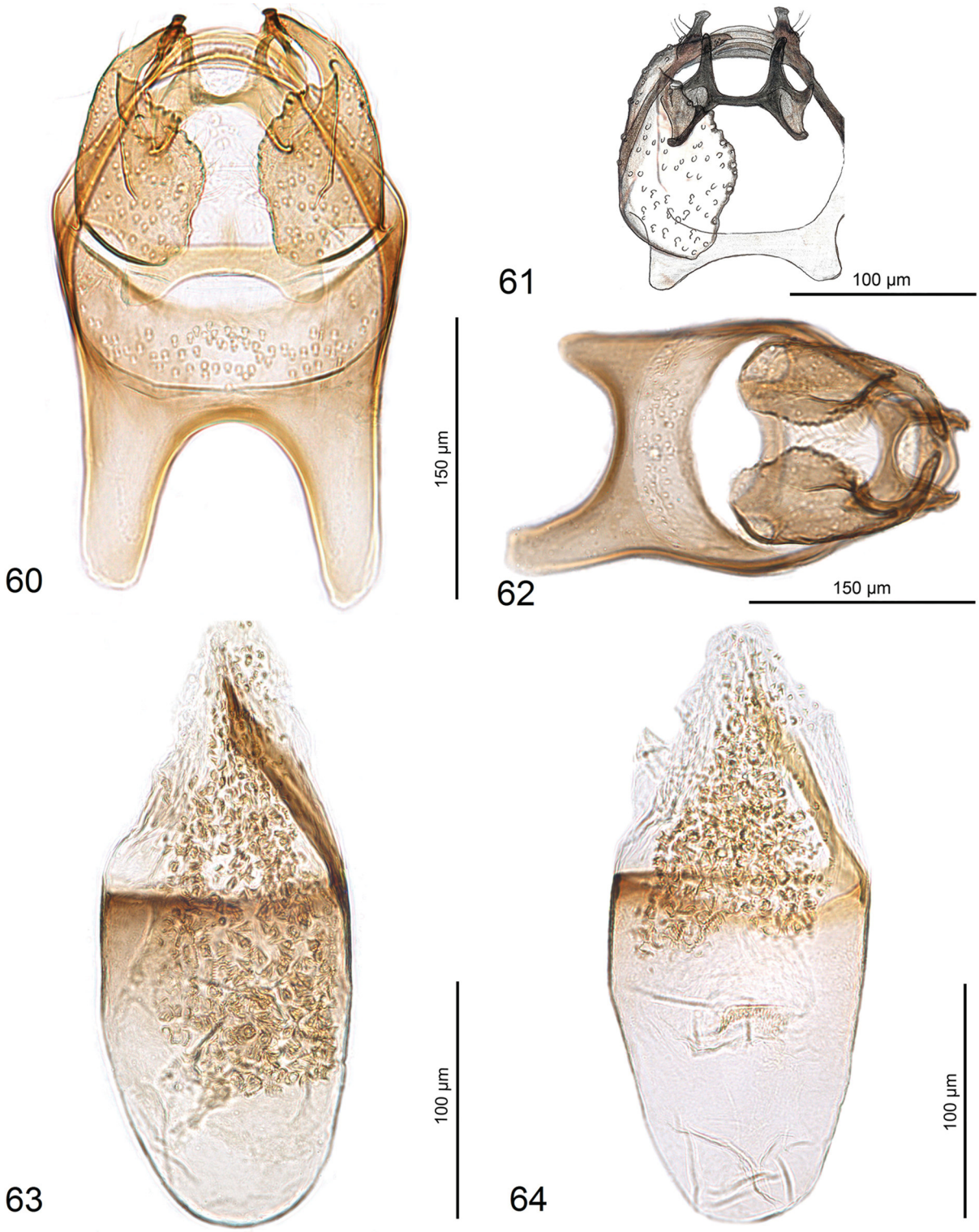
FIGURES 45–48. Male genitalia of *Stigmella truncata* Remeikis & Stonis, **sp. nov.** 45, holotype, genitalia slide no. RA433; 46, paratype, genitalia slide no. RA410; 47, non type-series specimen, genital capsule, genitalia slide no. RA496; 48, same, phallus.



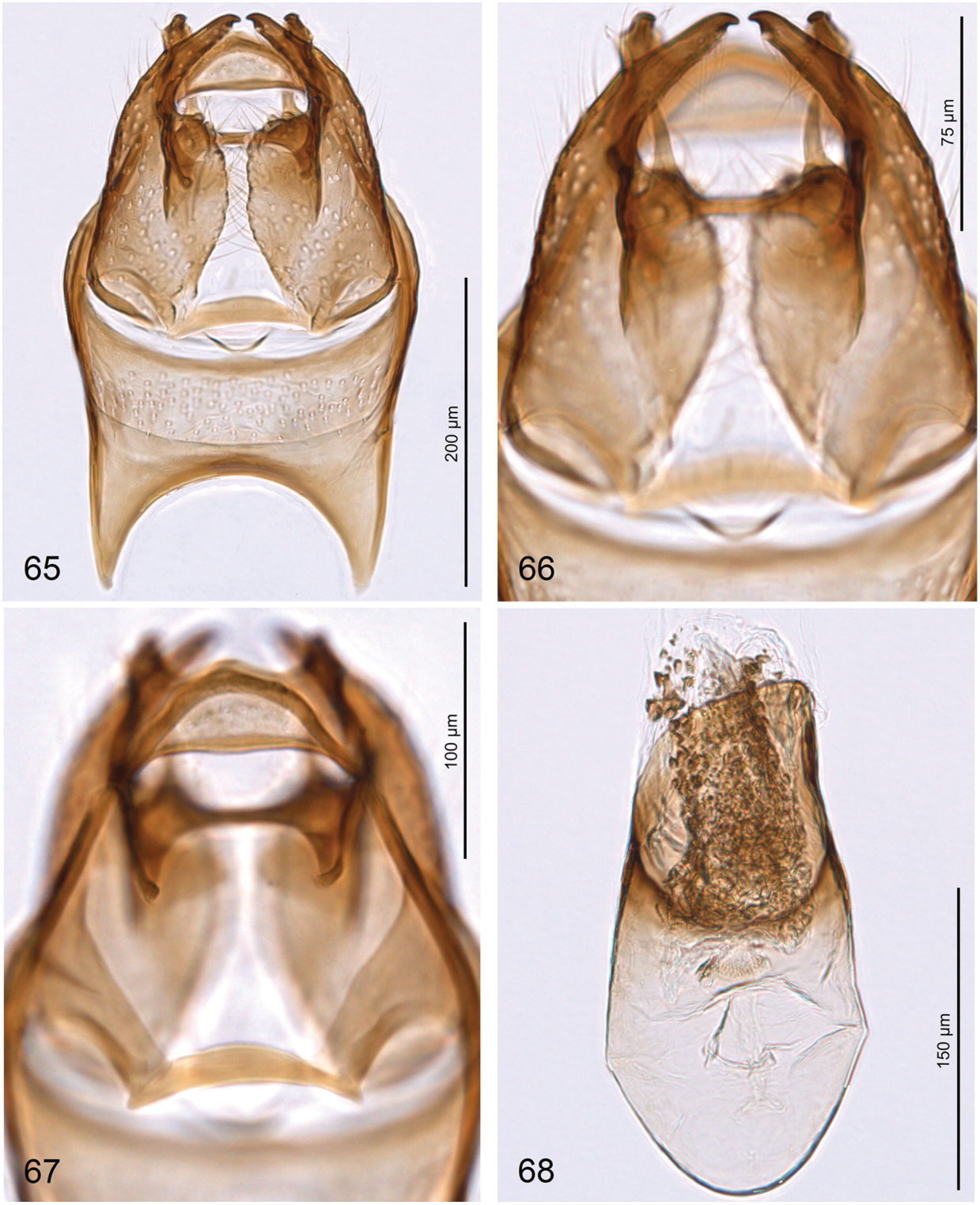
FIGURES 49–53. Male genitalia of *Stigmella truncata* Remeikis & Stonis, **sp. nov.** 49, left valva, paratype, genitalia slide no. RA410; 50, uncus and gnathos, holotype, genitalia slide no. RA433; 51, right valva, paratype, genitalia slide no. RA410; 52, phallus, paratype, genitalia slide no. RA440; 53, same, artistic reconstruction with cornuti enlarged.



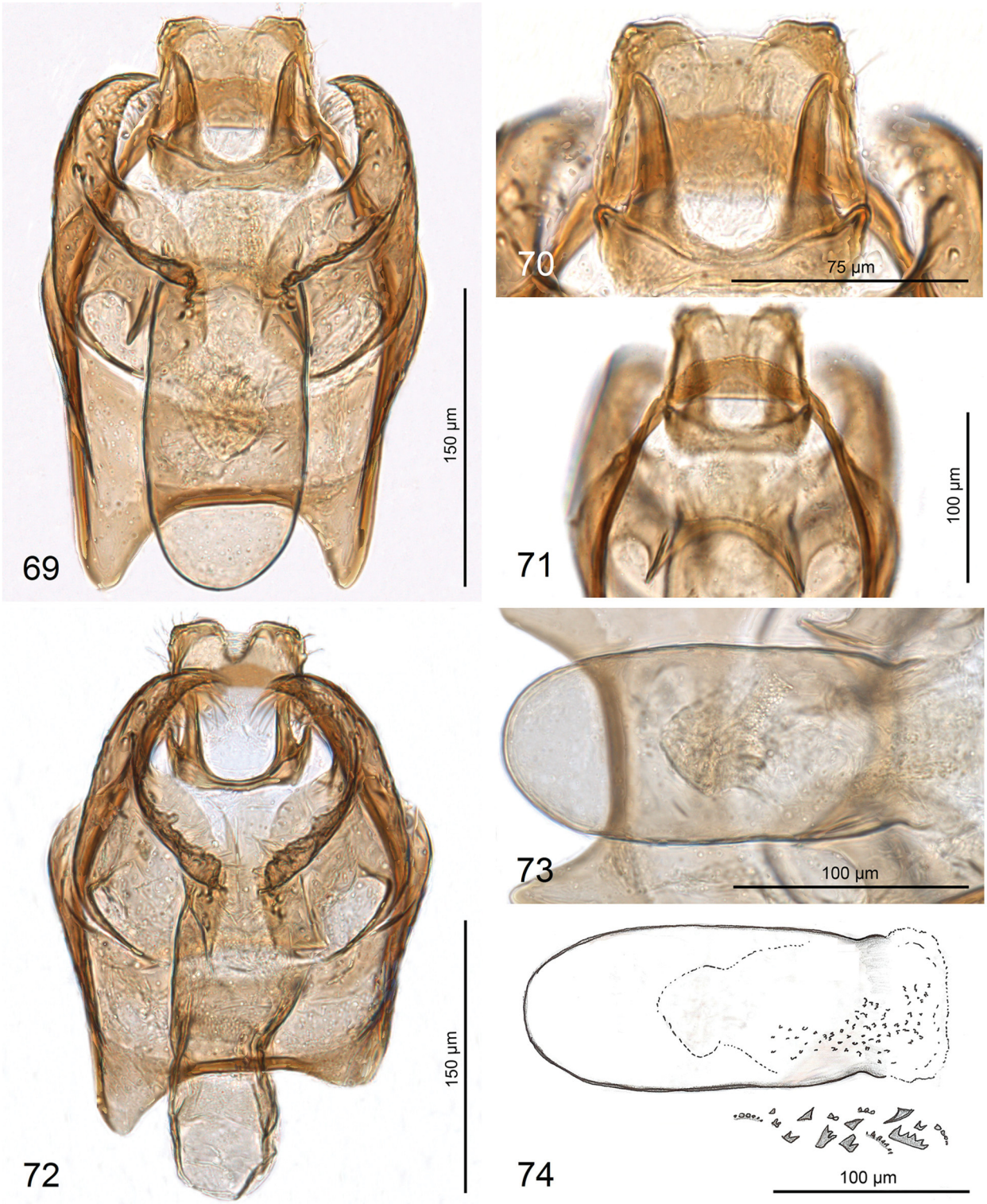
FIGURES 54–59. Male genitalia of *Stigmella sceptra* Remeikis & Stonis, **sp. nov.** 54, holotype, genitalia slide no. RA435; 55, same, uncus and gnathos; 56, same, valva; 57, same, phallus; 58, same, paratype, genitalia slide no. RA436; 59, same, artistic reconstruction with cornuti enlarged.



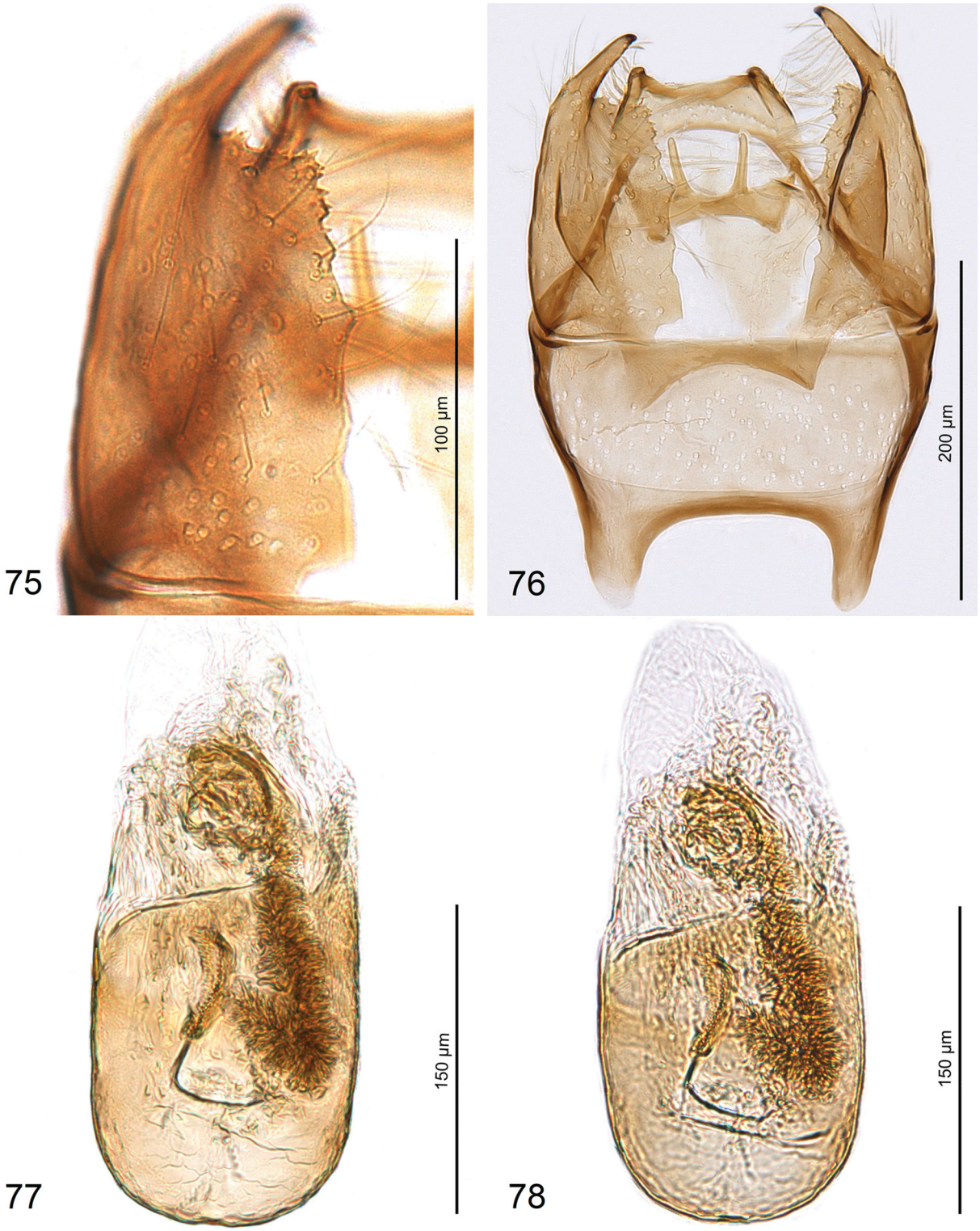
FIGURES 60–64. Male genitalia of *Stigmella concreta* Remeikis & Stonis, **sp. nov.** 60, holotype, capsule, genitalia slide no. RA498; 61, same, uncus, gnathos and valva; 62, paratype, capsule, genitalia slide no. RA408; 63, same, phallus; 64, same, other focus.



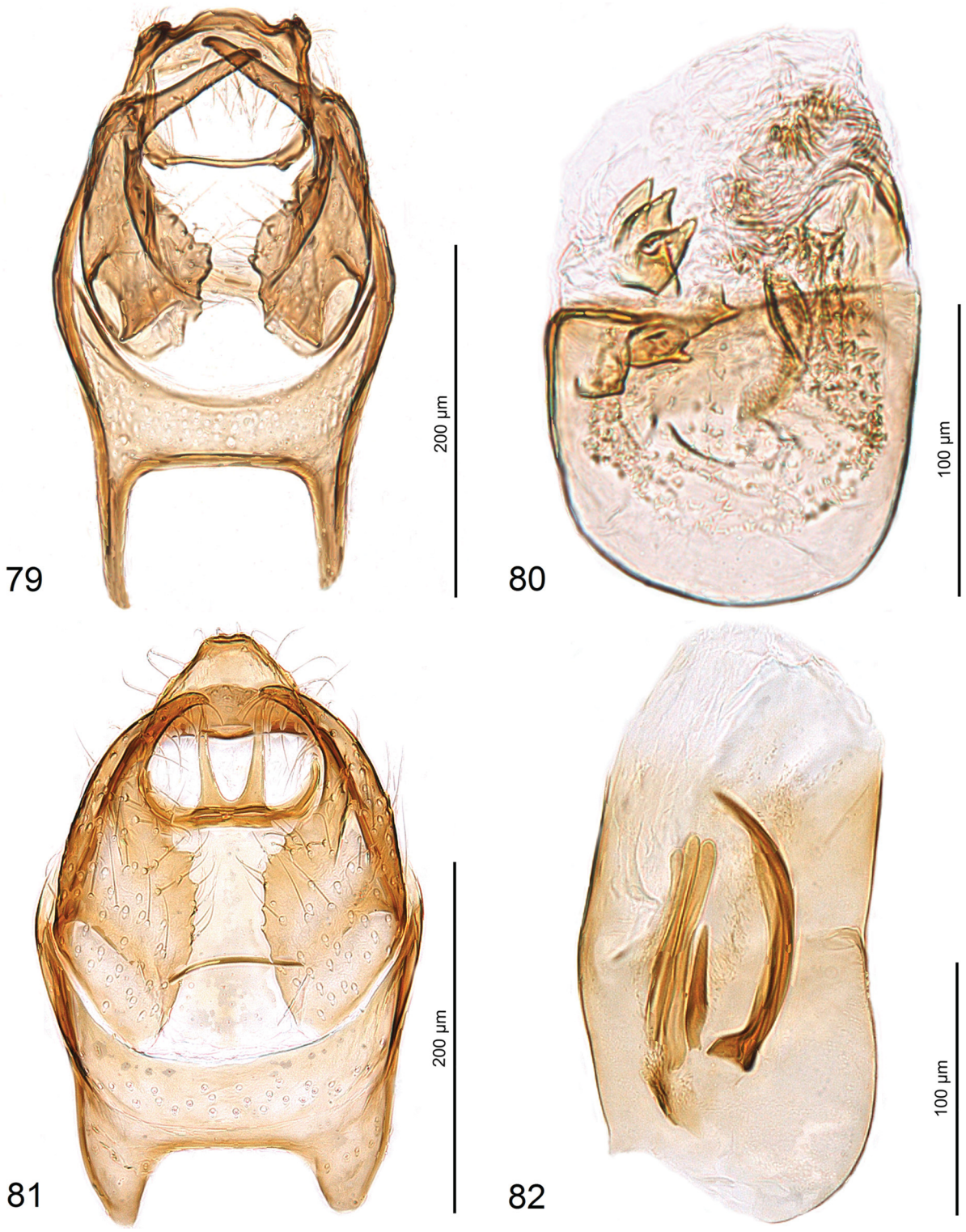
FIGURES 65–68. Male genitalia of holotype of *Stigmella pseudoconcreta* Remeikis & Stonis, **sp. nov.**, genitalia slide no. RA505. 65, genital capsule; 66, gnathos and valvae; 67, tegumen and transtilla; 68, phallus.



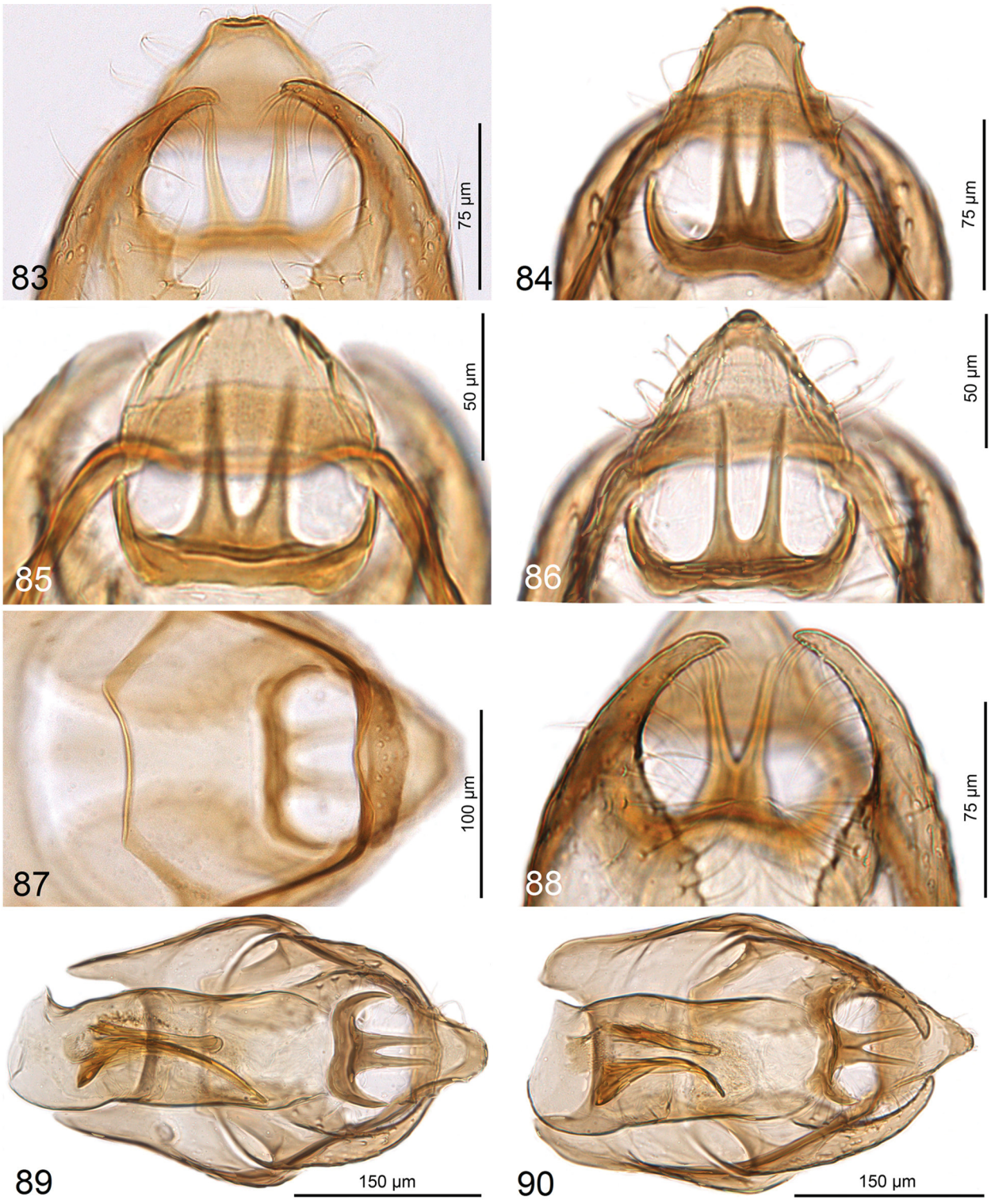
FIGURES 69–74. Male genitalia of *Stigmella quadrata* Remeikis & Stonis, **sp. nov.** 69, holotype, genitalia slide no. RA380; 70, same, uncus and gnathos; 71, same, tegumen and transtilla; 72, paratype, genitalia slide no. RA481; 73, holotype, phallus, genitalia slide no. RA380; 74, same, artistic reconstruction with cornuti enlarged.



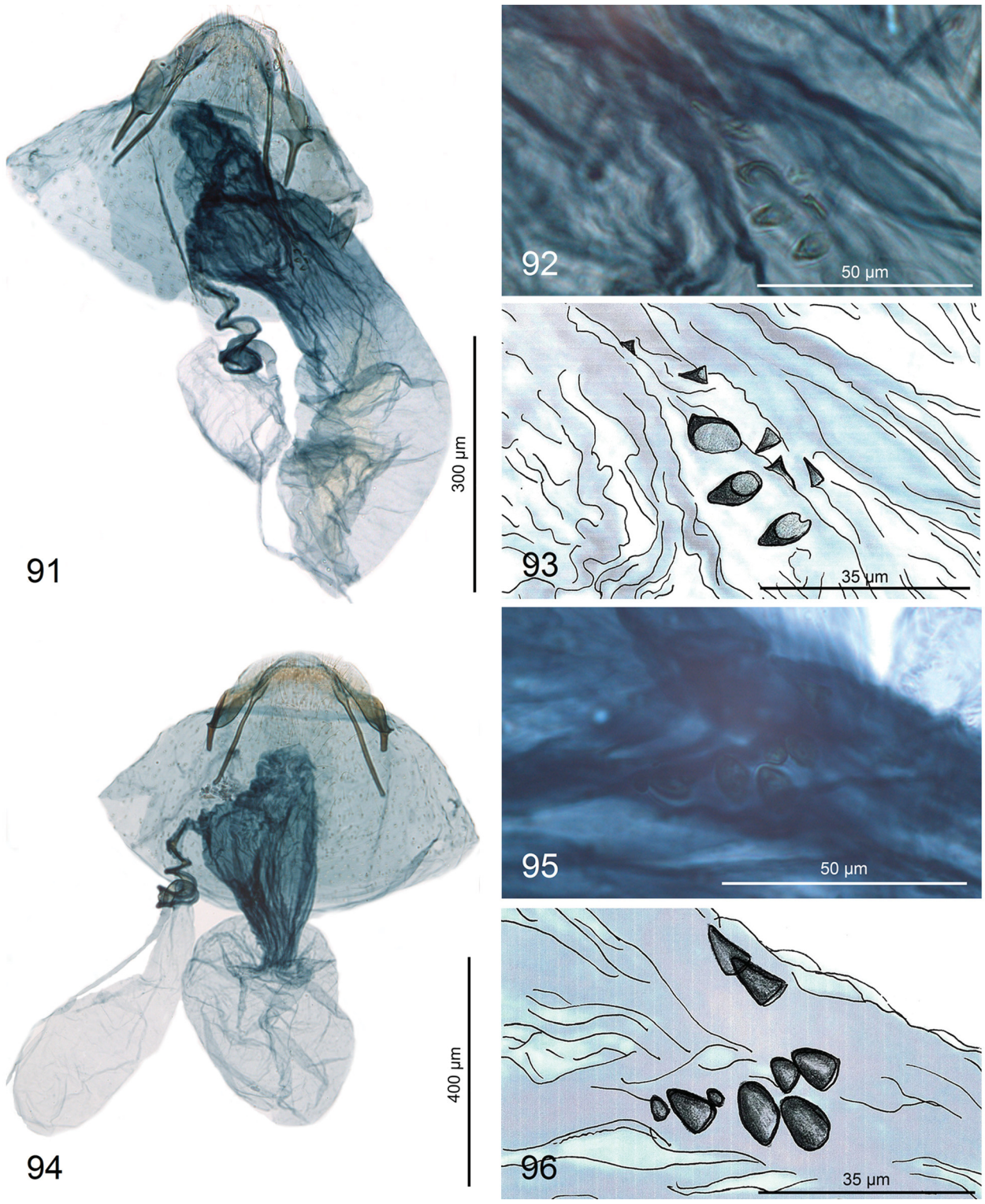
FIGURES 75–78. Male genitalia of holotype of *Stigmella semilactea* Remeikis & Stonis, **sp. nov.**, genitalia slide no. RA512. 75, left valva; 76, genital capsule; 77, phallus; 78, same, other focus.



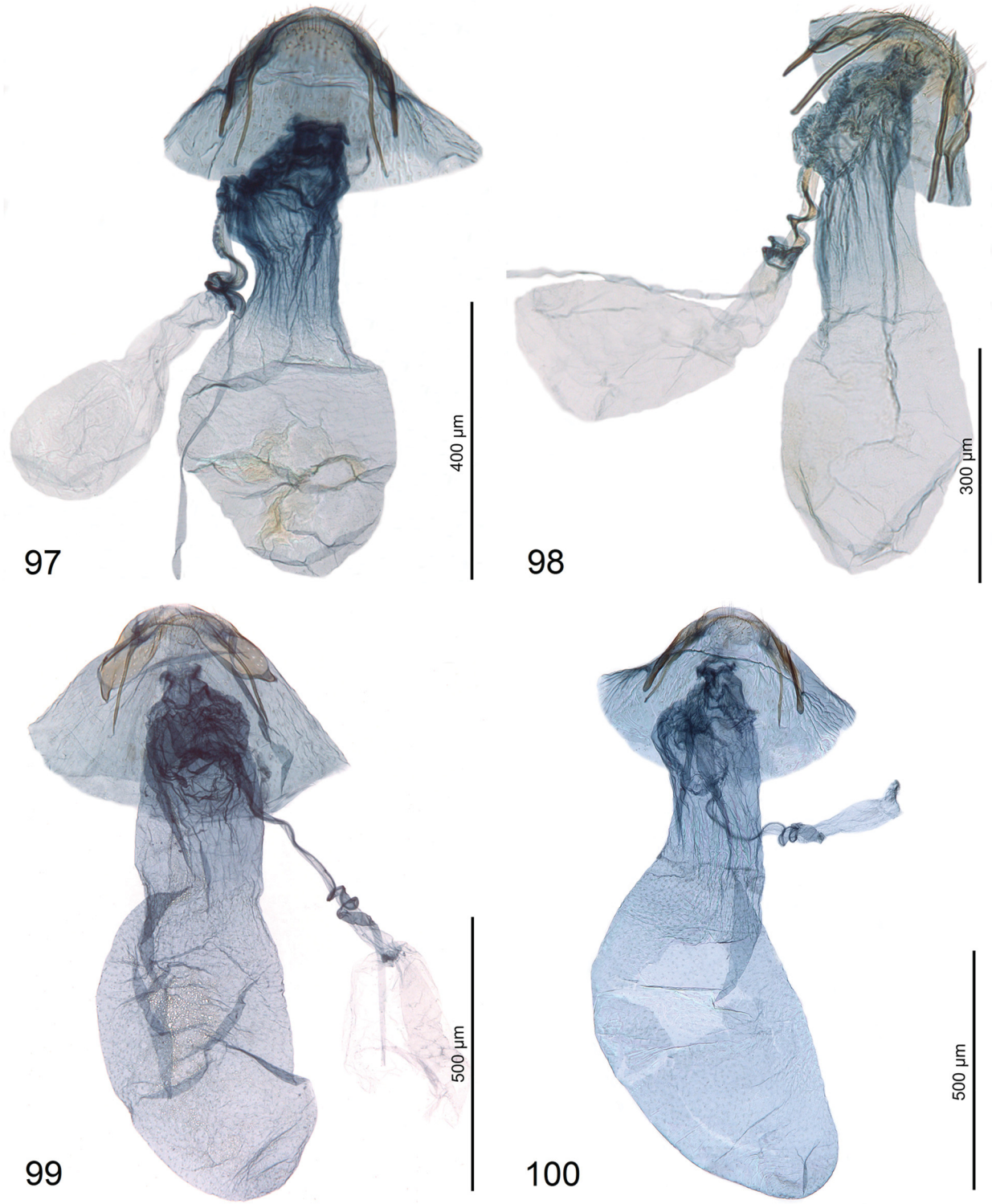
FIGURES 79–82. Male genitalia of holotypes of new *Stigmella* species. 79, *S. brutea* Remeikis & Stonis, **sp. nov.**, genitalia slide no. RA332, genital capsule; 80, same, phallus; 81, *S. pseudodigitata* Remeikis & Stonis, **sp. nov.**, genitalia slide no. RA516, genital capsule; 82, same, phallus.



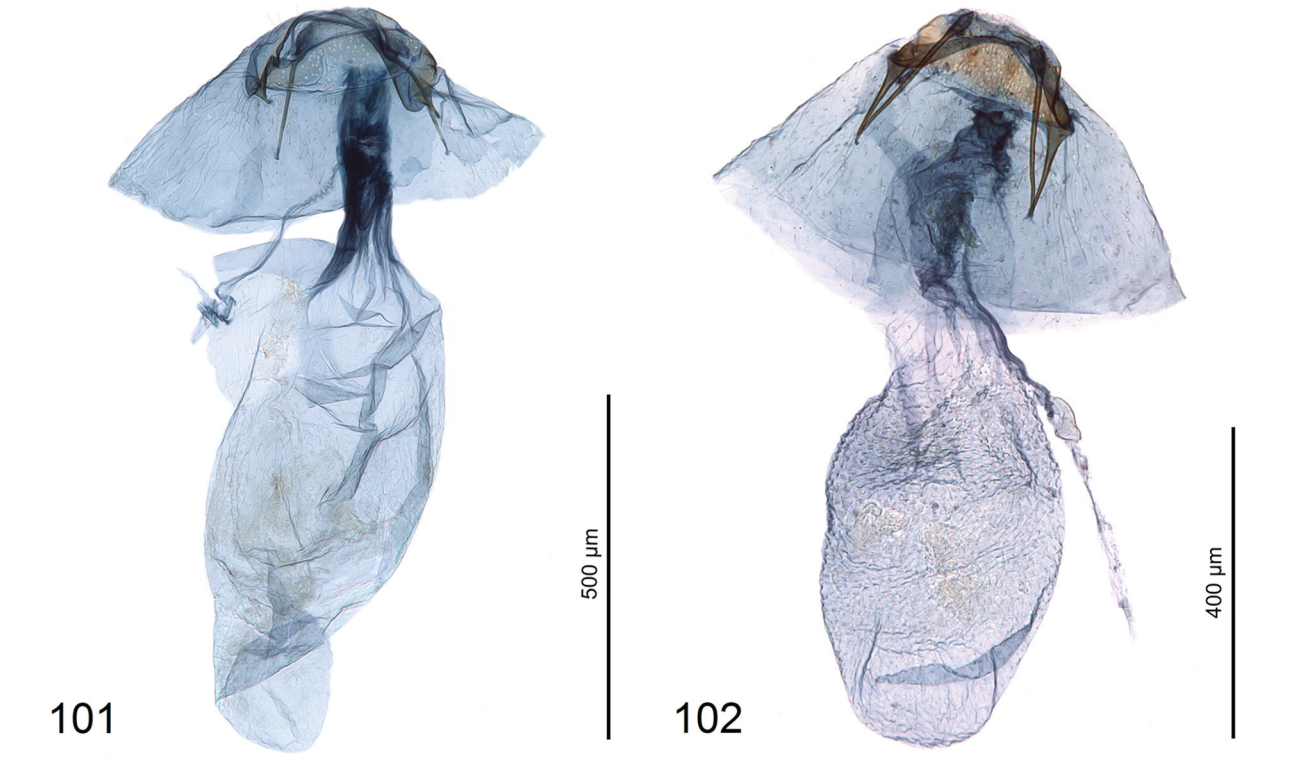
FIGURES 83–90. Male genitalia of *Stigmella pseudodigitata* Remeikis & Stonis, **sp. nov.** 83, uncus and gnathos, holotype, genitalia slide no. RA516; 84, same, paratype, genitalia slide no. RA354; 85, same, genitalia slide no. RA368; 86, same, genitalia slide no. RA367; 87, tegumen and transtilla, holotype, genitalia slide no. RA516; 88, gnathos, paratype, genitalia slide no. RA390; 89, capsule with phallus inside, paratype, genitalia slide no. RA354; 90, same, paratype, genitalia slide no. RA390.



FIGURES 91–96. Female genitalia of paratypes of new *Stigmella* species. 91, *S. purpurimaculae* Remeikis & Stonis, **sp. nov.**, genitalia slide no. RA463; 92, same, thickened spines in bursae; 93, same, artistic reconstruction; 94, *S. cana* Remeikis & Stonis, **sp. nov.**, genitalia slide no. RA461; 95, same, thickened spines in bursae; 96, same, artistic reconstruction.



FIGURES 97–100. Female genitalia of paratypes of new *Stigmella* species. 97, *S. truncata* Remeikis & Stonis, **sp. nov.**, genitalia slide no. RA506; 98, *S. sceptra* Remeikis & Stonis, **sp. nov.**, genitalia slide no. RA569; 99, *S. semilactea* Remeikis & Stonis, **sp. nov.**, genitalia slide no. RA341; 100, same, genitalia slide no. RA509.



FIGURES 101, 102. Female genitalia of new *Stigmella* species. 101, *S. semilactea* Remeikis & Stonis, **sp. nov.**, odd, non type-series specimen, genitalia slide no. RA511; 102, *S. brutea* Remeikis & Stonis, **sp. nov.**, paratype, genitalia slide no. RA372.

Designation of *Stigmella purpurimaculae* group

Species groups in Nepticulidae are highly valuable for diagnostic purposes to make associations easier, especially in such large genera as *Stigmella* Schrank, with about 400 species described worldwide (also see Stonis *et al.* 2013a). In the present paper, we designated one more species group, the *purpurimaculae* group, for the species which possess remarkable genitalia characters: the partially reduced tube of the phallus (Figs 5, 6), the dentate cornuti (Figs 5, 6), and the strongly developed utriculus in the female genitalia, which can be equal or longer than the corpus bursae (Fig. 4). The later two characters are unique among Nepticulidae and hitherto were unknown in the family, while the partial reduction of the phallus is also shared with two other species described in the current paper but not attributed to the *purpurimaculae* group.

Characters of morphology: forewing often with an apical purple spot; androconial scales absent; frontal tuft varies from fuscous brown to orange (Fig. 3); in the male genitalia, gnathos often broadly U-shaped, anterior processes of gnathos short or absent, chitinization of phallus reduced on distal part (partial reduction of phallus), vesica with numerous small dentate cornuti, manica absent; in the female genitalia, accessory sac weakly defined, ductus spermathecae strongly chitinized; utriculus unusually developed (as a large sac, sometimes even longer than corpus bursae); unique short, thickened spines sometimes occur in distal part of corpus bursae, signa absent.

Host-plant preferences unknown. More than 16 male and female adults of three species of the *purpurimaculae* group (*S. purpurimaculae* **sp. nov.**, *S. cana* **sp. nov.**, *S. truncata* **sp. nov.**) were collected around the Lenga beech – *Nothofagus pumilio* (Poepp. & Endl.) Krasser, Nothofagaceae, but there is insufficient evidence that *Nothofagus* is the host-plant.

Distribution and taxonomic diversity: the group currently comprises 7 species (all described as new in the current paper, and all occurring in the southern Andes.

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Ole Karsholt and Niels P. Kristensen (ZMUC) provided the initial stimulus for the present project together with generous support during its course. We thank Patricia Gentili-Poole (USNM) for her consultation. We are grateful to Jean-François Landry (Agriculture & Agri-Food Canada, Ottawa) and anonymous referees for their numerous corrections and suggestions. For support the authors thank the Science Foundation of the Lithuanian University of Educational Sciences (Vilnius).

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